American Journal of Public Health
and THE NATION'S HEALTH

Volume 28 June, 1938 Number 6

Problems of a Housing Enforcement Program

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THE diagnosis of the problem of providing decent and sanitary homes for the lowest income group seems to be definite and clear-cut, and yet its solution is many sided. The diagnosis is poverty—poverty of the tenants and poor income to the owners of the slum dwellings. The solution, however, is not simply that of publicly subsidized housing, enforcing sanitary and housing ordinances, slum clearance, great private housing developments—nor all these together.

The solution in its entirety must include provisions for people who are poor; those who have no steady jobs; those on relief; those who are old or blind; those whose husbands may be habitual drunkards or known by social agencies as "good for nothings"; those whose income will permit the payment of only $1 a week rent for the entire living unit whether they need 1 room or 5 rooms; those who can pay only $2 a week rent; and those who can pay only $3 a week rent for the entire living unit. In Memphis this group includes approximately 50 per cent of the population, 80 per cent of this 50 per cent being negroes. These are facts and not estimates.

It is the problem of housing poor people, then, which to public health departments and possibly to other interests is the most important of all. Without an attack on this lowest income group, there will be no permanent, substantial, public health improvement. Sanitary facilities in the home cannot be rented or maintained under present conditions by poor people. There is no agency or program now aimed, at least not so as to hit the bull's-eye, at this lowest income group. Some, in fact most, of the above listed groups in which the greatest housing needs exist, are not eligible for housing in federal housing projects.

There is some truth in the oft repeated statement that

> . . . new large scale good housing built for the large middle class income groups will release moderately good housing for occupancy by the next lower income groups, bringing about a general upward movement that will empty slum properties for the wreckers.

However, studies of the slums in

Dilapidated Houses in the $1 to $1.50 a Week Rental Class

Memphis indicate that this oft repeated quotation is not complete and should be amended to read:

> . . . new large scale good housing for the large middle class income groups will release moderately good housing for occupancy by the next lower income group, bringing about a general upward movement of people that will empty many slum properties for the wreckers and *will thus take the cause of slums into slightly better housing to turn it into a slum for future emptying.*

A slum is a slum because there is no income, or insufficient income to build or maintain the housing in a decent or sanitary condition. An upward movement of poor people into a better housing area can bring blight and disaster to any district with distressing rapidity. In the long run, $1 a week will rent a $1 a week house and $2 a week will rent a $2 a week house.

In trying to arrive at the solution, it should be recognized that an average figure or picture of housing or slums for the United States may be misleading for any individual section, or city of the United States. An average picture of conditions for the country as a whole, based on actual facts and not estimates and guesses, may indicate that 9.6 per cent of the shortage in non-farm family dwelling units exists in the rental group paying less than $10 a month rent, while a picture of conditions in Memphis indicates that this figure if used to show needs for housing is grossly misleading. Eight and six-tenths per cent of all dwellings in the city are dilapidated to the point that it would not be practical to attempt patching or remodeling to meet a minimum standard. These dilapidated dwellings are occupied by the people in

TABLE I

Rentals, Vacancies and Crowding Classified According to Degree of Bad Housing *

Housing Index †	*Total Units Occupied*	*Total Population Housed*	*Per cent Vacant*	*Average Weekly Rent per Unit*	*Average Rooms per Unit*	*Average Weekly Rent per Room*	*Average Persons per Room*
0 to 29	2,342	7,487	4.87	$1.82	2.91	$0.620	1.09
30 to 49.9	7,670	27,276	6.49	2.34	3.31	0.703	1.07
50 to 64.9	7,290	28,440	4.27	2.92	3.93	0.740	0.99
65 to 79.9	5,571	24,488	4.29	3.92	4.69	0.830	0.93
80 to 100	5,894	30,321	3.26	6.97	6.29	1.108	0.81
Totals	28,767	118,142	4.59	3.70	4.31	0.850	0.95

* See *American Journal of Public Health*, July, 1937, p. 653 (Table I, Ref. 1 for Comparison with 1936 figures).

† "The housing index is a numerical value computed for each dwelling and for each block of dwellings, and indicates that the block averages a certain per cent of a minimum standard. The 0 to 29 per cent group, for example, includes all blocks whose average housing index for all dwellings in the blocks is less than 30 per cent of a minimum standard. The minimum standard arbitrarily adopted for Memphis is a dwelling that is constructed reasonably tight to protect the occupants from the weather; screened for protection against flies and mosquitoes; provided with inside private wash-down toilets; a water faucet and sink connected to the sanitary sewer; served by the municipal water supply; provided with adequate natural light and ventilation; having adequate provisions made for the use of heating facilities; facing a street and in a reasonable state of repair."

"The key facts for judging the dwellings surveyed are: (1) Location, condition, and use of toilet; (2) location, condition and use of water and sink; (3) condition of screens, roofs, floors, walls, ceilings, and chimneys; (4) the number of families provided for by the dwelling; (5) the number of persons housed per room; (6) the position of the dwelling on the lot (front or rear).

These factors when assigned more or less arbitrary numerical values, with deductions for unsatisfactory condition of the various items, give a picture of the degree of bad housing in comparison with the accepted minimum. The resulting figure for a dwelling is called the sanitary rating or factor. By grouping dwellings into blocks of dwellings, and combining with this figure the value referred to as a rear dwelling factor, a picture is obtained of conditions as they vary from block to block and area to area.

The scoring system is based on the allowance of such credit for the number (and in some cases the convenience) of water supply facilities and toilets, as well as for the general structural condition of the dwelling and for the number of persons housed per room. Deductions are made, depending on the degree of unsatisfactoriness of these items." The system of grading is described in detail in "A Yardstick for Slums," by Alfred H. Fletcher, *Engineering News Record*, August 26, 1937.

the $10 and under rent group. Seventy-three per cent of the colored and 6 per cent of the white population, or 34.5 per cent of the total population, live in the poorest of substandard housing and pay less than $9 a month rent. Other figures prove beyond a doubt, if need is the criterion used, that the greatest need for housing in Memphis is in the $10 a month or less rent group. This group is not, of course, of interest to private capital since the returns are not sufficient for the most part to meet expenses.

MEMPHIS PROGRAM

In an attempt to develop a fundamentally sound housing enforcement program, the Department of Health has made a series of studies as to the make-up of the Memphis slums. The first survey in 1933 and 1934 which

covered the entire city, seemed to show a definite relationship between outdoor communal toilets and typhoid fever, and between housing when grouped according to a housing index and infant mortality. The second study in 1936 and 1937 indicated that a slum is not uniform and may be classified into varying degrees of "slumness," with cores of the very worst type of slum in the center or centers, and varying degrees of progressively better slum housing radiating out from the centers or cores to the rim or blighted area. This blighted rim serves as a barrier between the slums and standard housing areas.

Table I summarizes the results of the 1936 and 1937 study, which was previously discussed in an article by the authors,[1] when the study was about 40 per cent completed. This table presents data from approximately 80 per cent of the total substandard housing areas of Memphis.

This two year summary verifies the conclusions of the 1936 report that,

> The law of supply and demand is plainly indicated. As the rents decrease the housing gets worse, the vacancies increase, crowding increases, and rooms per unit decrease. It would seem to point the way to where to apply enforcement proceedings in order to get the greatest returns for effort expended. Private capital getting reasonable rents and not furnishing a minimum standard house should be forced, and should welcome this enforcement on all owners without exception, to meet the standard in order to bring all houses in the blighted areas up to a decent standard. However, any effort to enforce minimum standards in the very low rental slum areas where the existing conditions are very bad can result only in slum clearance. This effort is worth while only where there is a sufficient per cent of vacancies, and should be directed toward the elimination of the worst dwellings.

FUTURE PLANS

The question may well be asked, as a result of these studies, what are the plans for the future housing enforcement program of the Department of Health and what will this program accomplish in the way of improving existing conditions? As a result of these studies up to the present time, when viewed from a public health standpoint, several fundamental facts stand out:

1. The poorest people live in the poorest houses for which the lowest, if any, rents are collected.
2. There is a definite correlation between rents paid and the score made by the dwellings as judged from the standpoint of housing conditions by the Department of Health.
3. In view of the facts upon which the second fundamental statement made above is based, there seems to be some basis for the assumption that much of the public resentment, as well as the resentment of students of housing, against the greed and selfishness of owners of slum housing is unwarranted. The number of conveniences and sanitary facilities and their maintenance improve where economic rents are paid and decrease directly as rents decrease.
4. It is felt that if a planned concerted drive is made for the strict enforcement of a housing ordinance on the section of the slum paying the best rents, much permanent good can be accomplished in securing minimum standard housing and minimum standard housing areas or neighborhoods. Such a program should and will enlist the hearty coöperation of property owners who will benefit by this uniform enforcement for a neighborhood.

The blighted area or outer rim of the slum characterized by higher rents and better sanitation is undoubtedly the most promising field for securing improvements by an energetic enforcement program. Owners are better able to meet these demands because of better returns, and the general improvement of the area as a unit will be helpful in attracting paying tenants as the dilapidated, insanitary houses in this area are brought up to the minimum standard or are vacated and torn down. Of course, the tenant paying less than an economic rent will be forced to pay more or move. A gradual screening or squeezing program of this sort will

Memphis Houses with Outdoor Communal Toilets and Water

Houses in the $1 to $1.50 a Week Rental Class

eventually progress to the point where the owners will find it uneconomical to meet the demands of the Department of Health and houses will be vacated and in many cases torn down as the demands are enforced. This point will be reached when the "illusive sharp dividing line which is obviously impossible to determine" is reached. It seems that few cities have used the enforcement weapon in the most strategic manner in improving and decreasing the size of their slums. It is planned to continue the enforcement program in Memphis as initiated early in 1936 along the lines suggested above.

ENFORCEMENT AGENCIES AND PUBLICLY SUBSIDIZED HOUSING AGENCIES BOTH WORKING ON TOP SECTION OF SLUMS

It may be noted here that the enforcement agencies and the publicly subsidized housing programs are both working on this top section of the slums. The term "subsidized housing agency" as used in this paper refers to any agency that does now, or might be set up in the future to assist tenants individually, or as a group, in obtaining a minimum standard house by subsidizing their rent, either indirectly through capital grant subsidy or annual rent subsidy to the tenant, or indirectly through individual rent subsidy to the individual owner of houses rented to eligible tenants, or in any other similar manner.

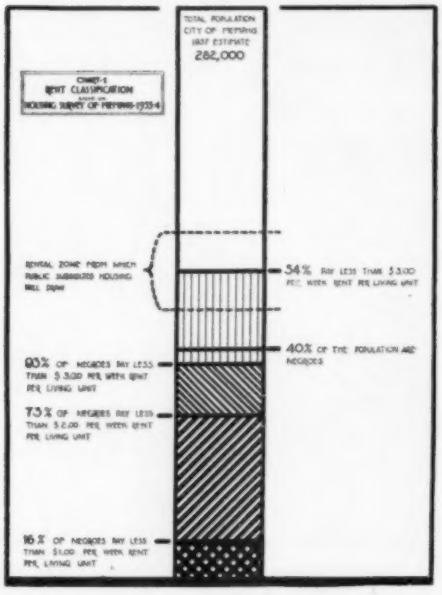
TOTAL POPULATION CITY OF MEMPHIS 1937 ESTIMATE 282,000
54% PAY LESS THAN $3.00 PER WEEK RENT PER LIVING UNIT
40% OF THE POPULATION ARE NEGROES

CHART I—Rent Classification Based on Housing Survey of Memphis, 1933–1934

In an attempt to visualize the housing problem in Memphis and to illustrate the present weakness in the method of attack, two charts have been prepared showing the population of Memphis as a bar or a column and showing the per cent of people in Memphis in certain classes or groups as per cents of the length of the bar. One of these charts is based on figures from the 1933–1934 housing survey of the entire city and the other is based on figures from the 1936–1937 studies of the slums and blighted areas of Memphis.

Chart I representing the 1933–1934 figures, indicates that over one-half of the population of Memphis pay less than $3 per week, or $13 per month rent for the entire living unit. It can also be noted that a very large part of this group paying such a low rent are negroes and that almost the entire negro population fall within this very low rental classification. Our housing problem, it can be seen from this, is largely a problem of housing the negro whose income is exceptionally low. Less than one-fourth of the negro population pay as much as $2 a week rent. If $5 or $6 a room per month is the rental set for the federal housing projects, then the zone from which occupants of these two projects will be drawn will undoubtedly be somewhere near as shown on Chart I, *i.e.*, in the neighborhood of the 54 per cent line. The public health need, however, for subsidized housing is greatest in the bottom section of the bar where housing conditions are worst.

This is where the rents collected are the lowest, since the people living here are the poorest. In addition, the enforcement agency can best handle, in fact, can only handle the problem for permanent and effective results in the top section of the slums.

Chart II using the 1936–1937 figures, outlines a rental classification of 118,-142 people with the survey estimated as approximately 80 per cent completed. This represents approximately 30,000 dwellings. It can be seen that the average rent paid by the three lowest classifications which is 66 per cent of the estimated 50 per cent of the population who live in the substandard areas is less than $3 per room per month.

The rental zone for the federal housing projects is shown as just above the 50 per cent line, since rentals in the federal projects are expected to be in the $5 and $6 per room per month class. As pointed out in the discussion of Chart I the greatest public health need is in the bottom section of the bar or population where housing conditions are worst. Here the rents are lowest because the occupants are poorest.

It should be evident, therefore, that publicly subsidized housing and enforcement programs are both working on the same group and, if an energetic publicly subsidized housing program is carried on, the housing enforcement agency will probably have to withdraw from its program. The drawing or fear of drawing the cream of the paying tenants away from private owners of houses catering to this group will make it almost impossible to get their cooperation because of what will be referred to as unfair competition. The Department of Health will then have to and probably should confine its activities to alleviating complaints as best it can and carrying on a generally admitted impossible, ineffective, educational campaign of teaching slum dwellers to live healthfully without adequate and satisfactory sanitary facilities. It may be said here that this paper should in no way be considered as criticism of the two federal housing projects in Memphis, but as pointing to the great need for housing for the "forgotten children" of families unable to pay an economic rent and living under the worst conditions of insanitation and dilapidation.

COÖPERATIVE PROGRAM DESIRABLE

On the other hand, a coöperative program would seem to promise the most rapid and effective housing program that could be devised. The enforcement agencies could concentrate on the top section or blighted areas of the slums and work down the scale as far as possible, requiring minimum standards in these better sections of the slums where rents are paid and condemning all dilapidated and nonconforming houses. Then the publicly subsidized housing program could supply houses for the group that pay almost no rent, for those on relief, or for

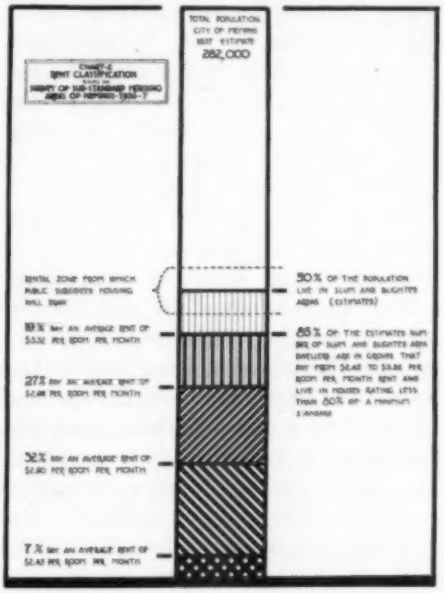
TOTAL POPULATION CITY OF MEMPHIS 1937 ESTIMATE 282,000
50% OF THE POPULATION LIVE IN SLUMS AND BLIGHTED AREAS (ESTIMATES)
85% OF THE ESTIMATES NUMBER OF SLUMS AND BLIGHTED AREAS INCLUDED ARE IN GROUPS THAT PAY FROM $4.40 TO $5.86 PER ROOM PER MONTH RENT AND LIVE IN HOUSES RATING LESS THAN 60% OF A MINIMUM STANDARD
32% PAY AN AVERAGE RENT OF $4.80 PER ROOM PER MONTH
7% PAY AN AVERAGE RENT OF $5.43 PER ROOM PER MONTH

CHART II—Rent Classification Based on Survey of Substandard Housing Areas of Memphis, 1936–1937

those who can pay only at times. Publicly subsidized housing could have as its goal, then, the lowest 5, or 10, or even 15 per cent without worrying about this "illusive sharply dividing line which obviously cannot be determined." The dividing line in the lowest 15 per cent can be taken as zero and would be a logical base line from which to start developing a publicly subsidized housing program. It seems entirely possible then for the enforcement agency to start at the top of this slum dwelling group, let us say 30 per cent of our population, and by working down the scale could actually force minimum standards to be met by some 10 or possibly 15 per cent of our population, so that the enforcement program would meet the publicly subsidized housing program half-way between the upper and lower lines.

HOUSING FOR RELIEF WORKERS

The second of the last two housing studies in Memphis was made of the Works Progress Administration work relief rolls and the general direct relief rolls as of June, 1937. It was found that approximately 80 per cent of these WPA clients and 86 per cent of the general direct relief clients, including both white and colored, live in the slums of Memphis. This statement is based on the fact that they live in blocks which rate less than 80 per cent of a minimum standard for decent housing as determined by the Department of Health.[2] It should be pointed out here that the Memphis Health Department minimum standard, which is the standard referred to throughout this discussion, is considerably lower than the federal public housing minimum standard. The Memphis Health Department minimum is possibly lower than the average citizen would consider essential to decent living. It does not include electric lighting or gas connections, running hot water, any system of heating except flues so located that the occupant can install stoves and have flues for proper venting. It also does not include a bathtub and other items included in the present publicly subsidized housing projects. The results of the study are summarized in Table II.

It may be pointed out that although a high per cent of both white and colored people on work relief live in the poorest types of housing, the per cent of colored living in the two lowest groups is almost 3 times the per cent of whites living in the same types of housing. This trend continues in the group on direct relief although the difference in the per cent falling in the lowest classes between colored and whites is not as great. The rates of both white and colored on direct relief in the groups living under the worst housing conditions are approximately 5 points higher than the same groups on work relief.

HOUSING FOR RELIEF CLIENTS IMPORTANT

Of course, the question may arise in the minds of many as to whether we will always have people on relief. No doubt the relief load will vary considerably, with a minimum load during good times and a maximum load during depression. It is possible, therefore, that for the very lowest group or for the relief group the present program of publicly subsidized housing is not the solution. Nevertheless, from a public health standpoint, this is the most important group to be provided for, and unless the present program is changed considerably the Department of Health will be hindered rather than helped in its effort to provide better sanitary conditions for slum dwellers.

It might be found desirable to see to it that those on relief be furnished minimum standard housing as a part of their relief through government leas-

TABLE II

Distribution of WPA and Direct General Relief Clients According to Housing Condition

Works Progress Administration Relief Rolls *

	White		*Colored*		*Totals*	
Legend	*Per cent*	*Accumulative Per cent*	*Per cent*	*Accumulative Per cent*	*Per cent*	*Accumulative Per cent*
0 to 29.9	6.6	....	24.7	....	15.0	....
30 to 49.9	16.9	23.5	34.5	59.2	25.1	40.1
50 to 64.9	23.5	47.0	18.6	77.8	21.2	61.3
65 to 79.9	21.5	68.5	11.6	89.4	17.0	78.3
80 to 100	31.5	....	10.6	....	21.7	....
	General Direct Relief Rolls †					
0 to 29.9	10.0	....	24.4	....	18.2	....
30 to 49.9	21.1	31.1	40.7	65.1	32.3	50.5
50 to 64.9	26.6	57.7	18.5	83.6	22.0	72.5
65 to 79.9	18.2	76.0	9.8	93.0	13.4	85.9
80 to 100	24.1	....	6.6	....	14.1	....

* A 25 per cent sample of the 5,588 families on the rolls, June, 1937.
† 100 per cent of the families on the rolls surveyed.

ing of approved, privately owned houses. This method would result in much repair and improvement work both on the houses and in the spacing of groups of houses. An added advantage in this plan would be the elasticity of leasing the number needed to care for the relief load. As the clients leave for private employment, the demand for private houses increases and the need for leased houses decreases. Another problem at this bottom section of the slum may be the mentally deficient ones or families in which the breadwinner is worthless, shiftless, lazy, given to drunkenness, and otherwise unfit to provide for the family. Some type of institutionally directed self-supporting project may be the answer to this problem.

There are in every city—and Philadelphia is no exception—many families who have be-

come so degraded they do not know how to live in a hygienic way. There are problem families who need case work treatment. Nine out of 10 families will respond to good housing, but no amount of good housing will lift others out of the depth into which they have fallen. Some are mental cases, some health cases, some are degenerates. They would bring even good houses down to the level of the slum houses. For the sake of society they must be reclaimed or segregated under municipal control. Until they and others less subnormal who persistently practice sloppy living are forcibly restrained from fouling the houses they occupy, they will continue to make slums. Such families should be subjected to the compulsion of instructive inspection, and when such educational approach proves inadequate they should be removed to municipal colonies, forced to labor in the open, given medical and social treatment, and be allowed to leave such control only when they have demonstrated they can so maintain hygienic living that they will not be a menace to society.[3]

These suggestions are made to indicate possibilities rather than to attempt to solve a most difficult problem. The solution of this, however, is most important from a public health point of view and if not definitely included in the housing program, will discourage public health workers in trying to realize any benefits, and, it would seem, will take from the housing program most of the public health arguments used to justify it.

PRESENT GOVERNMENT HOUSING SUCCEEDS OR FAILS IN ITS OBJECTIVES

If the present publicly subsidized housing program is designed to help the man who has a house to live in that does not leak, has a private toilet and running water, has screens and windows, etc., but who lacks hot water or steam heat, plenty of yard space and grass and flowers, gas, mechanical refrigeration, and other necessities for an abundant living, at a reasonably low cost, then it has been successful in achieving that goal.

If, however, the publicly subsidized housing program was designed partly at least to improve the sanitary conditions for people living without private toilets, without running water, without screens and windows, with leaking roofs, etc., then the program to date is a partial failure.

As worked out to date, it is providing a more abundant living for the low wage earner who is able to have a decent sanitary home without many conveniences only through sacrificing, but does nothing for the man or his children who live in a dilapidated, insanitary, poorly maintained house.

OBSERVATIONS AND CONCLUSIONS

1. The solution to the problem of providing decent and sanitary homes for the lowest income group is many sided, with poverty standing out as the prime underlying cause.

2. The contention that building houses for the middle class in order to help people in the slums is fallacious in Memphis.

3. The poorest people must of necessity live in the poorest houses and wherever the poorest people live they will sooner or later produce the poorest houses because of the inevitable lack of sufficient funds to maintain the minimum requirements. It may be conversely expressed as "any raising of the standard of existing housing must be followed by a corresponding increase in rents if the improvements are to be permanent."

4. The owners of slum dwellings maintain these dwellings under existing conditions, in general, in as sanitary and as decent a state of repair as is justified by the low rent collected.

5. The Department of Health, as the enforcement agency, can work on the top rental section of the slum dwellers, which is the same section that publicly subsidized housing projects are designed for. A coöperative program with publicly subsidized housing projects working on the lowest group and with the enforcement agencies working on the top group of slum dwellers, is desirable.

6. Poverty and relief are very closely associated, but people falling in these classifications are not eligible for housing in federal housing projects and are not amenable to improvement of housing standards through enforcement. There is no agency or program

now directed toward the relief of this group in the way of providing them with decent sanitary housing.

7. Eighty per cent of the people on work relief and 86 per cent of the people on direct relief live in the slums of Memphis.

8. Unless the publicly subsidized housing programs are redesigned or expanded in order to supply decent sanitary housing for people in the worst sections of the slums, the program will not enlist or deserve the continuing active support of public health departments, or officials even though they will surely not oppose it.

9. If subsidized housing does not include the lowest 10 per cent, then health departments can only attempt the impossible process of trying to educate slum dwellers to live healthfully in the slums without adequate or properly maintained sanitary facilities.

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Medical Writing

"IT is, indeed, a pity that this golden age of medicine does not coincide with the golden age of literature. Many important facts and ideas are buried, or at least in part concealed, by verbose or clumsy or otherwise inferior writing. In this matter the early education and environment of the doctor are often at fault. Not only has much of the fundamental cultural training of the youth been neglected, but even the rudiments of penmanship, spelling, grammar, and literary style are often too hastily covered to establish good habits in the student of the present generation. It has become almost a commonplace that the average doctor writes illegibly, spells atrociously, constructs barbaric sentences and paragraphs, and has an uncouth literary style. Since it is impossible to tell in childhood who will be the writers of medicine in the next generation, it would be wise to require of applicants for admission to the medical schools in the future a truly classical as well as a scientific fundamental education. The inclusion of Greek and Latin in language and literature, French and German, English in all its aspects, and history and archaeology in the premedical curriculum might easily make the difference between enjoyment and profit on the one hand and disappointment and neglect on the other, both in the reading and in the writing of important medical scientific papers and treatises. More and more we shall realize the truth of this, and shall strive to emerge from the barbarism of the medical literature of today to a higher level." — Gerrish Memorial Lecture: Doctors and Books. *New England J. Med.*, 218:338–343 (Feb. 24), 1938; *J. Assoc. Am. Med. Colleges*, May, 1938.

The Epidemiology of Trichinosis*

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WORK done by recent investigators places squarely before public health workers the question—Is trichinosis a serious public health problem, and if so, what can we do about it? The data submitted in this paper do not answer either of these questions, but we hope they show some of the intricacies of the problem and throw some light on what needs to be done and what information needs to be assembled.

Hall and Collins [1] have reported that in a group of 1,778 autopsies which they believe constitutes a fairly composite sample of American people, not less than 12½ per cent showed infestation with trichina. Dr. C. V. Weller, pathologist at the University of Michigan Hospital, recently informed us in a personal communication that from the first 25 examinations made, using a 50 gm. diaphragm digestion method advised by McCoy,[2] he found 5 positive for trichinosis, while, in the second 25 no positives were found. Dr. Weller is continuing his study in order to have a larger group on which to base conclusions.

The writers' interest in trichinosis has been stimulated by discovery, within a year, of 2 relatively large outbreaks, the first in the vicinity of Rogers City, Mich., during January and February, 1936, for which we have histories for 32 cases; the second in Capac, Mich., for the most part in December, 1936, and for this we have data for 72 cases. Capac and Rogers City are approximately 200 miles apart and have nothing in common other than that they are small towns in rural areas in Michigan. The distance of these towns from our office and the lack of hospitalization have made it difficult to study the outbreaks as thoroughly as desired.

The Rogers City outbreak occurred among a few related families and their friends, who ate sausage prepared on a farm, the owner of which was father or grandfather to most of the cases. Three of the families involved visited the "old folks" and all but 2 persons ate uncooked smoked sausage. These were the only 2 who escaped illness. Although unfortunately no eosinophil counts were made, clinical symptoms in all individuals diagnosed were quite typical. Diagnosis was confirmed by finding the organism in a sample of the sausage in question.

In the Capac outbreak we have been able to make a more complete study. Detailed histories have been obtained, based on several interviews of each case. Eosinophil counts were secured on the majority of cases from 1 to 3 months after onset. Intradermal tests as proposed by Bachman [3] were made on the majority approximately 8 months

* Read before the Epidemiology Section of the American Public Health Association at the Sixty-sixth Annual Meeting in New York, N. Y., October 8, 1937.

TABLE I—(Capac Outbreak)

Source of Pork

A—Number of Cases According to Manner of Cooking and Source of Pork Eaten During Month Previous to Onset

	Persons Eating Pork But No Sausage			Persons Eating Sausage, Incl. Those Who May Have Had Other Pork			
Source	Raw	Cooked More or Less	Cooked Thoroughly	Raw	Cooked More or Less	Cooked Thoroughly	Total
Dealer X only	0	3	0	12	12	37	64
Dealer X and Y	0	0	0	0	0	0	0
Dealer X and other (not Y)	0	0	0	1	0	0	1
Total Dealer X	0	3	0	13	12	37	65
Dealer Y	..	..	..	0	0	3	3
No Pork	..	..	..	..	..	..	4

B—Non-cases in Households with Cases, According to Manner of Cooking, and Source of Pork Eaten, 1 Month Previous to Onset

Dealer X only	0	0	2	0	13	*57	72
Dealer X and Y	0	0	0	0	0	0	0
Dealer X and other (not Y)	0	0	0	0	0	0	0
Total Dealer X	0	0	0	0	0	0	0
Dealer Y	0	0	0	0	0	1	1
No Pork	..	..	..	..	..	..	21

* One of these was subsequently determined to be a case.

after onset. Diagnosis was confirmed on 2 cases by autopsy specimens. The diagnoses were well established in all but 2 or 3 cases. Tables have been compiled showing these data for the Capac outbreak.

The town of Capac consists of about 800 people. It is the trading center for a rural population of some 2,000 or 3,000. The fresh meat supply is almost entirely distributed through 2 retail stores, both securing their pork and beef from local farmers.

Table I shows data concerning pork eaten by those who became ill and by other members of the household. Table II gives information concerning the hogs marketed in Capac during the

TABLE II—(Capac Outbreak)

Sources of Hogs Killed and Marketed in Capac During November and December, 1936, Showing Farmer from Whom Purchased and Dealer

Dealer X		
Farmer	No. of Hogs	Date Killed
A	2	11- 5-36
B	2	11-15-36
C	3	11-15-36
D	1	11-15-36
E	½	11-17-36
F	5	11-25-36
G	1	12- 1-36
H	7	12-17-36
I	6	12-24-36

Dealer Y		
Farmer	No. of Hogs	Date Killed
J	2	11-18-36
K	*1	12- 5-36
L	*1	12- 7-36
M	*1	12-12-36
N	*1	12-22-36
O	*1	12-31-36

* Dealer Y had no record of number of hogs purchased from each farmer but "usually bought a hog at a time."

month preceding the outbreak. A study of these data indicates that the pork causing the trouble was that handled by Dealer X, who sold perhaps 75 per cent of the pork consumed in Capac. Of the 72 cases, 65 gave a history of having eaten some kind of pork from Dealer X during the month preceding onset. Three stated that they had had pork only from Dealer Y. Some maintained that they had not eaten pork at any time for one month preceding onset. Sixty-one of the 72 cases ate sausage and 12 of these admit having eaten raw sausage; 12 are uncertain as to how well the sausage was cooked, while 37 housewives who cooked the sausage contended it was well done. Two members of Dealer X's family were cases, likewise 2 members of the family of a man who had a financial interest in Dealer Y's business and, therefore, customarily bought meat from him but who on one occasion bought X's sausage.

In Table III are listed the 45 families in Capac having one or more cases. In these households there were 72 or 73 individuals with trichinosis and 93 or 94 persons who escaped any noticeable symptoms. Eighteen of the 94 were skin tested and all found negative to 1:10,000 antigen. Of the 45 families there were 32 with 1 case only, and of these 32, 19 were females who may have tasted sausage in its preparation. A comparison of the 94 well individuals (Table I) in these households shows a lower percentage of them having pork or sausage than of those who were cases. None of the well individuals admit eating raw sausage and only a few were not sure that it was well cooked.

TABLE III—(Capac Outbreak)

Capac Households with One or More Cases Showing Number of Cases and Non-cases in Each

Family No.	*No. of Cases*	*No. of Persons with No Symptoms*
1	4	0
2	1	1
3	2	6
4	1	4
5	2	5
6	1	2
7	2	1
8	1	0
9	1	3
10	3	1
11	1	2
12	1	5
13	1	0
14	2	2
15	1	3
16	1	3
17	1	1
18	1	4
19	1	*3
20	1	0
21	3	1
22	2	1
23	1	6
24	1	1
25	1	0
26	1	1
27	1	8
28	9	0
29	1	2
30	1	1
31	1	2
32	1	3
33	2	0
34	4	0
35	2	0
36	1	3
37	1	3
38	1	0
39	1	3
40	1	2
41	1	2
42	1	7
43	1	1
44	1	0
45	3	1
Totals	72	94

* One of these subsequently determined as a case

REASON FOR CAPAC OUTBREAK

The Capac outbreak was an unusually large one, but the exact source or reason for the outbreak is not evident. A study of the chronological chart presents some interesting hypotheses. The first case of which we have a record gives an onset September 20,

TABLE IV—(Capac Outbreak)

Eosinophilia

(All data on basis of first count made in each case)

A. Eosinophilia and Symptoms

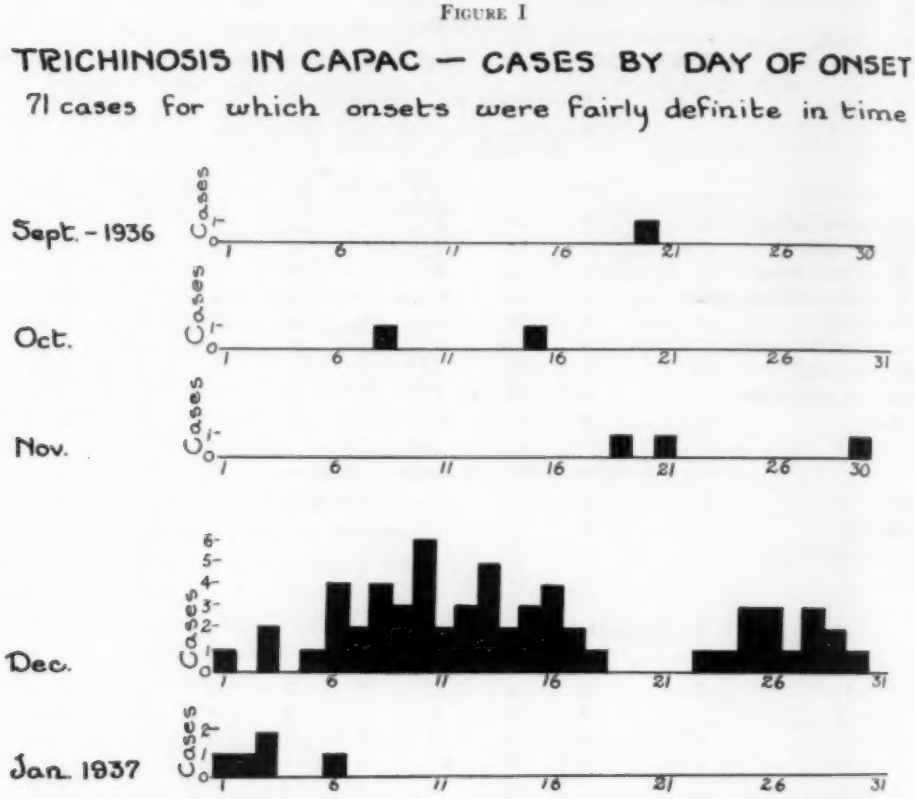
	No. of Cases According to Degree of Eosinophilia							
Symptoms	*0–3%*	*4–9%*	*10–29%*	*30–49%*	*50% and Over*	*No Count*	*Total*	*Average* *
Gastrointestinal only	1	0	5	0	1	0	7	21.7
G.I. and edema	1	2	2	2	0	0	7	19.3
G.I. and mus. pains	1	0	2	1	1	2	7	26.4
G.I., edema, and mus. pains	0	5	8	4	2	4	23	23.6
Edema only	0	1	4	1	0	0	6	21.0
Edema and mus. pains	0	4	9	2	0	1	16	19.1
Mus. pains only	1	0	2	1	0	0	4	20.5
None of 3 symptoms	0	0	1	1	0	0	2	30.0
Totals	4	12	33	12	4	7	72	21.9
B. Eosinophilia and Severity of Case								
Mild	1	1	7	3	0	1	13	22.4
Moderate	1	3	11	3	1	1	20	21.7
Severe (not fatal)	2	7	15	6	3	0	33	22.4
Fatal	0	1	0	0	0	5	6	6.5
C. Eosinophilia According to Time After Onset								
Time Count Taken								
1st week	0	2	0	1	0	0	3	18.0
2nd week	1	1	6	1	0	0	9	18.5
3rd week	0	2	5	1	0	0	8	19.2
4th week	0	3	13	4	1	0	21	23.3
5th week	3	2	7	5	2	0	19	19.9
6th week	0	1	0	0	0	0	1	6.0
7th week	0	0	1	0	1	0	2	35.0
14th week	0	1	0	0	0	0	1	6.0
17th week	0	0	1	0	0	0	1	20.0
D. Control Group (no cases in household—general population selected at random)								
	38	20	3 †	0	0	0	62	4.2

* Averages are not exact but are weighted, using the median percentage point in each column for all counts except in the 50% and over column where the minimum figure of 50 is used for each count.
† Includes one person who was later considered as a probable case.

the second October 8. The third case with recorded onset of October 15, is of uncertain onset and questionable diagnosis. The first 2 cases are definite but cannot be accounted for as a part of the outbreak proper, the first of which may be said to be that with onset November 30.

Hogs killed and marketed during November and perhaps December must account for the majority of cases. The hog purchased by Dealer X on November 15 from Farmer D (see Table II) was a sow of considerable age and size and was made entirely into sausage. Perhaps this one animal accounts for most or all of the cases following that date. Those cases preceding this time may be the normal sporadic incidence common to such communities. The outbreak occurred in two waves with an intermission of several days which is unexplainable. The sausage made from this one hog probably was the

FIGURE I



main supply sold in Capac during a period of several weeks beginning near the end of November.

CLINICAL SYMPTOMS AND SEVERITY OF CASE

The cases in the Capac outbreak have been analyzed as to clinical symptoms and in Table IV-A the different combinations of these symptoms is shown together with degree of eosinophilia. Not always is the "textbook picture" present, namely, gastrointestinal symptoms, edema and muscle pains. When gastrointestinal symptoms are present they do not always precede other symptoms.

Six of the 72 cases were fatal. Thirty-five of the non-fatal cases gave histories of diarrhea, the duration of which for 9 was less than a week, for 15 over 2 weeks, and for 8 over 4 weeks. In 48 cases there were muscle pains and in 20 of these such pains lasted for over 2 months. There was edema present in 46 cases lasting for less than 1 week in 18, and more than 2 weeks in 11 cases. Fifty-five of the 66 non-fatal cases spent time in bed due to illness, and for only 7 of these was this time less than 1 week. In 17 cases the time in bed exceeded 1 month. Fifty-three cases were in persons employed, including housewives, and of these 46 lost more than 4 weeks' work because of illness. In only 2 cases was the time lost from work less than 1 week (see Table V).

We were struck by the many complications and serious debility following the acute symptoms. Because of inability to follow closely each case

TABLE V—(Capac Outbreak)

Severity of Cases

Number of cases according to duration of symptoms, time in bed, and time off work (Including only those cases for which data are complete) *

	1 Day	2–6 Days	1–2 Wks.	2–3 Wks.	3–4 Wks.	4–5 Wks.	5–6 Wks.	6–8 Wks.	2–3 Mos.	3 Mos. Plus	Total
Symptoms:											
Diarrhea	1	8	11	6	1	2	1	1	3	1	35
Mus. pains	0	2	5	4	4	7	2	4	11	9	48
Edema	3	15	17	4	4	2	1	0	0	0	48
Time in bed	0	7	10	11	10	4	4	6	2	1	55
Time off work	0	2	0	2	3	15	5	4	10	13	54

* Not including six fatal cases

we were able to tabulate in Table VI only what we believe is a very incomplete list of such complications. Eight months after onset it was common to find individuals who could not do their work because of lack of physical endurance. In a number of cases, a heart which may have been abnormal before the trichinosis, did not develop decompensation until afterward. Nervous instability occurred frequently, some patients trying to express this by saying, "I feel I can't hold myself, I just want to fly to pieces." In one instance the father of a case thought his daughter was becoming insane. On the basis of duration of symptoms and loss of time from work we have arbitrarily grouped the 72 cases as to severity as follows: 6 fatal, 33 severe, 20 moderate, 13 mild.

TABLE VI—(Capac Outbreak)

Cases with Symptoms or Complications in Addition to Diarrhea, Edema or Muscular Pains (Partial List)

Conditions	*No. Cases*
Appendicitis *	3
Bronchitis	3
Pneumonia	1
Pleurisy	1
Cardiac involvement	2
Paralysis (extremities)	2
Special senses affected	2
Symptoms suggesting involvement of central nervous system	4

* One case ruptured appendix

EOSINOPHILIA

We believe the eosinophil count to be the most useful laboratory aid to diagnosis—during the early stages. Although not always diagnostic it probably would be so in a very high percentage of cases if blood smears were made at frequent intervals from onset throughout the acute illness. However, severe cases may have a low count. The time after onset when the blood smear is taken is a factor in the degree of the eosinophilia found. Table VII, although giving few data, tends to indicate that the eosinophilia decreases 5 or 6 weeks after onset. In Table IV-A we have attempted to show a relation of degree of the eosinophilia to symptoms, in Table IV-B to severity of case, and in Table IV-C according to time after onset. There is also shown a control group, Table IV-D, of eosinophil counts taken from a random sample of the population of Capac excluding households having cases. Data in Table IV-C confirms that in Table VII indicating a slight rise in the degree of eosinophilia from first to fourth week. There was no apparent association of the eosinophilia with any particular symptom nor did the severity of the case appear to coincide with the degree of the eosinophilia.

TABLE VII—(Capac Outbreak)

Percentage of Eosinophilia

Showing reduction with time after onset

The Weeks After Onset in Which Each Count Was Taken

Case No.	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th	13th	14th	15th	16th	17th	18th	19th	20th	21st	22nd	23rd	24th	25th	26th
13	..	..	52	..	..	..	..	..	..	..	..	42	..	..	..	..	..	..	..	..	..	..	..	..	..	..
19	..	..	..	..	62	..	..	..	..	..	..	..	..	13	..	..	..	..	..	..	..	..	..	..	..	..
23	..	36	..	..	..	..	..	..	..	13	..	12	..	..	..	6	..	..	..	..	..	..	..	..	..	..
25	27	..	..	..	..	..	..	..	..	..	13	..	10	..	..	..	4	..	..	..	..	..	..	..	..	..
26	..	..	..	..	35	..	..	..	..	..	..	..	..	..	..	..	..	8	..	..	..	..	..	..	..	..
33	36	..	..	..	..	..	..	..	..	..	..	..	..	..	10	..	..	..	..	..	..	..	..	..	..	..
36	..	..	..	61	..	..	..	..	..	..	..	25	..	..	..	..	..	6	..	..	..	..	..	..	..	..
37 *	..	..	..	..	..	52	..	..	..	..	..	..	37	..	48	..	..	..	..	..	..	..	..	..	..	..
38	..	22	..	..	..	..	..	..	..	..	..	..	..	14	..	..	..	6	..	..	..	..	..	..	..	..
42	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	25	..	..	..	..	..	..	..	10	..	6
52	..	..	..	..	40	..	..	..	..	..	..	12	..	12	..	..	..	..	..	..	..	..	..	..	..	..
55	..	..	38	..	..	..	..	..	..	..	..	8	..	..	..	..	5	..	..	..	..	..	..	..	..	..
58	..	..	..	..	..	19	..	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
62	..	..	..	46	..	..	..	..	..	..	..	..	..	6	..	..	..	..	..	..	..	..	..	..	..	..

* Case No. 37 showed eosinophile count of 12% in 38th week

INTRADERMAL TESTS

Skin tests were used on 74 cases occurring in Rogers City and Capac as well as on a number of other cases and controls. Our antigen was prepared in the laboratory of the Michigan Department of Health by C. B. Line, veterinary pathologist. The method of preparation was a slight modification of that used by Bachman.[4] The antigen was diluted to 1:500 and 1:10,000, and a control solution was made, using the same diluent without the antigen. Tests were made on 38 Capac individuals as controls who at the time presumably had no clinical evidence of trichinosis. Of the 38 there were 28 negatives, 1 doubtful, 3 mild positives, and 6 pronounced positives.* On rechecking, however, it was found that at least 3 of the pronounced positives and 1 of the mild positives definitely had clinical symptoms attributable to trichinosis. Twenty-one of the Rogers City cases were tested with the 1:10,000 dilution 18 months after the onset, and 17 were found positive. Fifty-four individuals in the Capac outbreak have thus far been tested with the 1:10,000 dilution, about 8 months after onset. All tests were observed for a minimum of 20 minutes. A few of those negative to 1:10,000 were retested with 1:500. The results of the 54 tests according to degree of reaction and clinical severity of case and according to eosinophilia are given in Tables VIII and IX. The few individuals found to be negative or doubtful reactors to the 1:10,000 dilution, and who were retested to 1:500 are indicated. There may be some relation between severity of clinical symptoms and degree of sensitivity to the protein of the organisms as measured by the skin test. More data on this point are needed. Sufficient time has not elapsed for our tested cases to be of value as an indication of duration of sensitivity to the trichina antigen. Thieler, Augustine, and Spink[5] found 5 out of 7 cases positive up to 7 years after infestation while Heathman[6] found 7 persons negative 6 to 10 years after infestation. It is important to know whether, many years after a clinical case of trichinosis,

* Our classification was as follows: Reactions showing 1 cm. or more of edema together with 2 cm. or more of erythema have been called pronounced, those with 0.5 to 1.0 cm. of edema with more or less erythema as mild, and those with any reaction less than this but differing from the control as doubtful.

TABLE VIII—(Capac Outbreak)

Degree of Skin Reaction in Relation to Severity of Case

(Antigen diluted 1–10,000)

	Number of Cases According to Severity of Symptoms			
Degree of Reaction	*Mild*	*Moderate*	*Severe*	*Total*
Negative	2	3	1	6
Doubtful	0	0	1	1
Mild positive	3	3	6	12
Pronounced positive	4 *	12 †	19	35
Total	9	18	27	54

* This number includes 1 case which did not react to the 1–10,000 dilution but gave a pronounced reaction to the 1–500 dilution.

† This includes 2 cases one of which gave a negative reaction and the other a doubtful reaction to the 1–10,000 dilution, but both gave a pronounced reaction to the 1–500 dilution.

the sensitivity to the antigen may be measured by the skin test or perhaps with the blood precipitin tests as proposed also by Bachman. We have done only 6 blood precipitin tests of which 2 were positive, these 6 having been positive to the intradermal test. The skin test is the more convenient procedure of the two. It usually becomes positive about 2 to 4 weeks after onset. This has been confirmed by McCoy, Miller, and Friedlander [7] and Spink and Augustine.[8]

In Table IX has been assembled data showing degree of eosinophilia together with degree of reaction to the skin test. In 1 case with 3 per cent or less eosinophils there was a pronounced reaction to a 1:10,000 dilution of antigen. Seven cases with an eosinophil count of from 4 to 9 per cent showed a pronounced skin reaction. Of these 7, 2 were first found negative to a 1:10,000 dilution and pronounced positives only to the 1:500 antigen. The other 5 showed pronounced reactions to the 1:10,000 dilution.

On the other hand, there were 4 with eosinophil counts in the group of 10 to 29 per cent which were negative to the 1:10,000 dilution, and 1 which was retested and found negative to a 1:500 dilution. All of those with very high eosinophil counts gave pronounced reactions to the 1:10,000 dilution.

Most of the eosinophil counts were

TABLE IX—(Capac Outbreak)

Degree of Skin Reaction in Relation to Eosinophilia

(Antigen diluted 1–10,000)

	Number of Cases Having Counts of						
Skin Test	*0–3*	*4–9*	*10–29*	*30–49*	*Over 50*	*No Count Obtained*	*Total*
Negative	1	0	4	0	0	1	6
Doubtful	0	0	1	0	0	0	1
Mild positive	0	1	9	0	0	0	10
Pronounced positive	1	7 *	18 †	8	3	0	37
Total	2	8	32	8	3	1	54

* This number includes 2 cases which did not react to the 1–10,000 dilution, but gave pronounced reactions to the 1–500 dilution.

† This number includes 1 case which gave a doubtful reaction to the 1–10,000 dilution, but a pronounced reaction to the 1–500 dilution.

TABLE X—(Capac Outbreak)

Cases and Non-cases by Nationality

	German	*American*	*English*	*Greek*	*Belgian*	*Swedish*	*Danish*
Cases	38	27 *	2	1	2	1	1
Non-cases in household	32	55	1	0	6	0	0

* Twenty-two of these were of German descent of the third or fourth generation.

made from 4 to 6 weeks after the onset, while the skin tests were made approximately 8 months after.

INCUBATION PERIOD

In 25 of our cases we were able to determine with a fair degree of accuracy the date on which the sausage was eaten and the date on which first symptoms were noted. The mean incubation period for these 25 cases was 9.1 days, the median was 7 days. The longest incubation period was 17 days and the shortest 2 days. There were 4 persons in one family who ate sausage on the same day, 2 of whom definitely noted gastrointestinal disturbances 48 hours later; the other 2 after 7 and 12 days. For those cases other than the 25 already mentioned it was more difficult to ascertain the time of infestation or a definite onset, but it was certain that some of them had longer periods of incubation than 17 days. One case had an incubation period of not less than 30 days, possibly 35. Drake, Hawkes, and Warren [9] have determined the incubation period in 14 cases as varying from 4 to 27 days.

NATIONALITY

The question of nationality and food habits is often referred to in consideration of outbreaks of trichinosis. Hall [10] contends that in the United States most cases occur among Americans not of German descent although he admits the attack rate may be higher among Germans. In Rogers City all the 32 cases were of German descent. In Table X we have classified the Capac cases as to nationality, considering all of those as Americans whose parents were born in this country. It will be noted that more than 50 per cent were German on the basis of this classification and it may be further stated that 22 of those listed as American were of German descent of the third or fourth generation. Germans appear to have a liking for smoked, raw or rare sausage. On the basis of our experience, this dietary habit is the cause of higher incidence among these people.

SEX, AGE, AND OCCUPATION

The Capac cases are classified as to sex and age in Table XI and as to occupation in Table XII. Also in Table XI is given classification as to sex and age of well individuals in households with cases. There is perhaps no particular susceptibility of either sex or any age group. Perhaps men eat more meat and more sausage. If so, this is offset by the fact that women who are

TABLE XI—(Capac Outbreak)

Cases and Non-Cases by Sex and Age Distribution

	Sex		*Age Distribution*						
	M.	*F.*	*Under 10*	*10–19*	*20–29*	*30–39*	*40–49*	*Over 50*	*Total*
Cases	36	36	9	6	7	16	16	18	72
Non-cases (contacts) in household with cases	50	44	15	19	17	10	9	24	94

TABLE XII—(Capac Outbreak)

Cases by Occupation

	Preschool	*Thresher*	*Retired*	*Housework*	*Students*	*Factory Worker*	*Teacher*	*Mechanic*	*Merchant*	*Clerk*	*Banker*	*Farmer*	*Physician*	*Minister*
Number of Cases	7	2	3	29	8	3	1	1	5	3	1	7	1	1

preparing meals often taste the raw sausage for seasoning. Children appear to have milder cases and in the Capac outbreak there was a somewhat greater number of those under 20 in households with cases who escaped having the disease than of the older ages. May this not be due to the fact that parents discourage eating of much sausage by children? Occupation appears to have had no significance in the Capac cases.

GENERAL INCIDENCE

Little is known at present as to the real incidence of trichinosis. Relatively very few cases are diagnosed and officially reported to health departments. Aldridge [11] could find, as officially reported cases, in all state health departments a total of 1,550 cases from 1842 to 1914. The *Public Health Reports* have listed for 1930–1934 inclusive a total of 1,480 cases occurring in 21 different states, for the year 1935, 591 cases in 18 states, and for the year 1936, 297 cases in 13 states. Mild clinical cases may be diffcult to recognize but from our experience we believe physicians should diagnose without much difficulty such cases as constituted the majority in the two outbreaks we have reported. Prolonged diarrhea particularly with a greenish stool which cannot be otherwise accounted for should always call for an eosinophil count. Likewise, cases with muscle tenderness and pain should have an eosinophil count. It is true that many physicians are not aware that the trichinosis case should be reported. We have discovered recently quite by chance 3 cases in a Lansing hospital and since we have been interested in this disease, quite a number of cases have come to our attention.

IMMUNITY

There is little evidence as yet to show whether humans develop an immunity to trichinosis as a result of small and repeated infestations. McCoy [2] claims some experimental immunity in rats. Swartz [12] maintains that one attack of the disease does not confer immunity. If there is such a thing as immunity this would tend to explain the large number of infestations found in autopsies and the relatively small number of cases diagnosed during life. During our investigation in Capac a few individuals were found who showed either a high eosinophil count or a positive antigen skin test, or both, but who had no ascertainable symptoms.

INCIDENCE IN HOGS

In consideration of the problem of human trichinosis, study must be given to the incidence among hogs. No doubt infestation varies greatly according to locality and to manner of feeding. One hundred examinations of pig diaphragms made in the laboratory of the Michigan Department of Health were all found negative. Fifteen of these were fed on slaughterhouse offal. Ninety-four examinations of diaphragm tissue of farm hogs were made recently by Dr. William Thorpe and Hans Ruhland of the Department of Animal Pathology of Michigan State College and all found negative.

Hall [13] has collected data indicating that about 1 to 1.5 per cent infestation

exists in grain fed hogs for the country as a whole, and 3 to 5 times that much in garbage fed hogs. Hall outlines a suggested control program for human trichinosis based largely on restrictions of garbage feeding of hogs.

REMARKS AND SUGGESTIONS

It is the hope of the writers to continue the study of trichinosis, particularly as to endemic incidence and the amount of human disability the disease may cause. We believe our data thus far will help to reveal the significance of the antigen skin test and the eosinophil count, to add to our knowledge of the symptomatology. There are given the epidemiological characteristics of two large outbreaks. We make no other conclusions but desire to offer a few remarks and some suggestions based on a study of the literature and our own experiences.

1. *Incidence of Infestation*—Further work should be carried on in the study of autopsy material to determine the incidence of human infestation in various parts of the country. Figures presented thus far by various workers indicating 10 to 15 per cent infestation need to be corroborated. Pathologists may perhaps collect data as to degree of infestation and this may be correlated with any evidence of clinical symptoms during the life of the individual.

2. *Clinical incidence*—The clinical incidence as manifested by cases with more or less severe attacks incapacitating the individual for a time and perhaps leaving permanent disability may be far less than the percentage of individuals infested as shown by autopsy studies. Certainly the percentage of such cases is, however, greater than that which is known at present. The help of various public health workers is needed to determine the real incidence of clinical trichinosis.

a. The Practising Physician—Physicians should be informed that trichinosis may be quite common. They should be instructed as to the symptoms of trichinosis and its many manifestations. If one is on the alert the average case should not be particularly difficult to recognize. The eosinophil count is not used frequently enough. Diagnosed cases should be officially reported.

b. The Health Officer—The health officer should publicize the disease using the utmost conservatism to avoid arousing the undue fear of the public. He should collect all reports and epidemiological data concerning cases and outbreaks, ask that eosinophil counts be made, and have intradermal tests performed.

c. The Laboratory Research Worker—It is at present difficult to secure reliable trichina antigen. Some standardization is needed, also further work to show the significance and possibilities of the intradermal and precipitin tests.

d. Epidemiologists—Epidemiologists should assemble and analyze data collected by local health officers. They may also make group studies on different samples of population using the intradermal and precipitin test. They can correlate data as to incidence among hogs, and finally from all of the facts attempt conclusions.

3. *Incidence in Hogs*—Veterinary-pathologists and departments of agriculture should collaborate in the study of trichinosis by determining more completely the incidence among hogs in various parts of the country; likewise for hogs according to manner of feeding.

4. *Control*—Only if the above questions have been answered can the real solution to control be known. It may be one of control of the garbage fed hog or it may be education of the public as to the danger of raw or partially cooked pork. Perhaps such education should be directed especially to those persons with dietary habits peculiar to certain nationalities.

CONCLUSIONS

The problem of trichinosis has been reopened by data recently assembled. It requires further study. Trichinosis may be a public health problem of considerable magnitude. It cannot be dismissed as a "rare disease."

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Legislative Enactments in the Province of Ontario

THE following items are supplied to the *Journal* by B. T. McGhie, M.D., Deputy Minister of Health and Hospitals of the Ontario Department of Health:

The sale of unpasteurized milk in any city or town in Ontario is prohibited by an amendment to The Public Health Act. This legislation can be extended to other areas of the Province from time to time by Order-in-Council.

Authority has been given to the department to make regulations for the qualifications of medical officers of health. An act provides that a medical officer shall cease to hold office at 70 years, unless the municipal council with the approval of the Minister continues him in office from year to year to the age of 75.

Wide powers are given to the local health authorities to deal with typhoid and paratyphoid carriers. When a person is deprived of his means of livelihood by reason of an order of a medical officer of health, the Province will pay him compensation, the amount to be determined by regulations.

A Cancer Remedy Act has been enacted providing for the appointment of a commission by the Government of Ontario with power to require any person in the Province to submit to the commission any substance or method of treatment used for cancer. The commission may thereupon investigate the merits of the remedy and may issue a public report of its findings.

Far-reaching changes have been made in the system of financing tuberculosis sanatoria. These were formerly maintained by municipal and provincial grants for each needy patient. Municipal liability has now been abolished and the total cost will be defrayed by the Province. It is expected that as a result there will no longer be any financial restraint upon the admission to hospitals of persons suffering from tuberculosis.

Nutrition Program in a State Health Department*

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A PROGRAM of public education in the dietary improvement of health was conducted during the 1936–1937 school year in Kent County by the Delaware State Board of Health, in coöperation with the State Board of Education and the State Extension Service in Agriculture and Home Economics. Credit for its execution should go in large measure to the enterprise, ability, and enthusiasm of Pearl MacDonald, State Nutritionist, whose services we were enabled to share on a half-time basis by the generosity of the University of Delaware. I wish here to express our gratitude to those whose previous efforts in this field have stimulated and guided ours. I present this account to you with the hope that our organization, methods, and experiences may have some practical value to others who contemplate, or who are engaged in similar undertakings.

Let me tell you first what we did, then how we did it, and finally why we did it.

Kent County was chosen for the demonstration for several reasons. With a population of 32,000, it contains only 4 communities which might be termed towns, or a total urban population of perhaps 9,000. It has 20 per cent negro population, the highest in the state. The death rates, except that for diphtheria, are generally higher in this than in the other counties. The 1933 maternal mortality was 168, the infant mortality was 81, the tuberculosis rate was 101. For this same year, the state maternal mortality rate was 61, the infant mortality rate 66, the tuberculosis rate 64.

Our objective was to make people realize the value of adequate nutrition to their children. The public was reached through posters, news stories, meetings, demonstrations, and circular letters to the parents of school children.

The posters used were a series obtained from the National Dairy Council, which kindly consented to our changing the verses so as to emphasize the protective foods. The news stories were printed in the Wilmington daily papers (the only dailies reaching the area) and in the weeklies issued in the county.

Seventy-two meetings were held—with parents in schoolhouses, with teachers or principals or both at these or at special conferences, and with Home Demonstration clubs, Parent-Teacher Associations, women's clubs, men's service groups, and granges (Pomona and subordinate). Through

* Read at a Joint Session of the Child Hygiene, Food and Nutrition, and Public Health Nursing Sections of the American Public Health Association at the Sixty-sixth Annual Meeting in New York, N. Y., October 8, 1937.

these, the key people of the county were reached. That they were interested was indicated by the scores of questions they asked.

May I mention here a mistake I think we made in these meetings. We did not serve refreshments. Where they were on the program anyhow, attendance was nearly always much greater. A mistake we avoided was sending people away altogether empty-handed; mimeographed sheets were given out on the importance of good foods and on ways to prepare them in attractive variety. Each person was asked to take two or three of these home, to give to the neighbor who could not come.

In demonstrations, we reinforced the effort which the Home Demonstration Clubs have been making for some years. Miss MacDonald held a special leader-training meeting on Better Breakfasts for Children. The 30 who attended gave demonstrations, in turn, to 364 women in the 23 clubs of the county. In one club, every member "adopted" a young mother in the neighborhood and passed on to her nutrition information given at the meetings.

Apart from the state-wide breakfast survey which I shall describe, 260 Home Demonstration Club members conducted a home breakfast study of their own, on 651 adults and 256 children. It showed them that too little milk, fresh fruit, eggs, and whole grain products were used.

The Parent-Teacher Associations arranged garden-planning and canning meetings in 29 communities. Twelve were colored groups. Total attendance was 537. Six groups agreed to can extra vegetables to be used this year for a hot dish for the school children's lunch.

A hot dish for lunch was served at twelve one-room and two-room schools where it had not been attempted before. In the larger schools, having cafeterias and a special school nurse, Miss MacDonald coöperated by helping the children to select good food for their money.

The principal of one small school bought four young rats for the children to feed, one pair on meat and potatoes; the other pair on fruit, vegetables, and milk as well.

Our fifth method of reaching people was by the circular letters to 4,400 families having children in school. There is no school census in Kent County. Accordingly, blank State Board of Health envelopes were taken by each district public health nurse to every school in her district. The teachers were asked to hold a letter addressing class. Each child practised writing the name and address of his parents, and finally wrote it on the envelope. The envelopes were collected by the teachers, and brought in to our central office by the nurse. The resulting mailing list proved 99 per cent accurate. The first letter was sent in the very envelope, franked by the state, which bore the child's handwriting.

Four letters were sent out during the year to this list. They were worded simply, and they reached the people who did not attend the meetings. The first stated what good food will do for the school child's health, happiness, and success. It ended: "The best breakfast, for the school child, is child-sized amounts of fruit, cereal, egg or bacon, milk, bread or toast. The school lunch should include one hot dish." It was signed by the State Superintendent of Public Instruction and the Executive Secretary of the State Board of Health.

The second letter enclosed duplicates of the mimeographed sheets handed out at the meetings, and repeated the reasons for giving children the protective foods. The third, signed by the County Agricultural Agent, advocated a year-round home vegetable garden, stated its money value, listed the kind

and cost of seed to be used, and told to whom to write for assistance with details. No direct check has been attempted on the effect of this, because an adequate one was not thought possible.

The fourth mailing was of a booklet, *Thought for Food*. It contained ten different inexpensive breakfasts, the costs and contents of several "pattern" breakfasts, dinners, and suppers, and a specific "Food Cost Guide." It was directly aimed to combat the argument so often heard: "We haven't money enough to buy the foods you say we should."

Early in the program a special personal letter was sent to the practising physicians, describing the nature and purpose of the endeavor, and asking their coöperation.

We realized before we started any of this endeavor that our public health nurses were not equipped to handle the field problems which it would plow up. Hence, as our first step, the state nutritionist gave them a special course, providing them with practical material and a working vocabulary for use in the home. Thus they were of real value to teachers and parents. Problem cases they brought to the nutritionist.

Emphasis throughout was laid upon the breakfast because this is believed to be the worst meal, from the nutrition standpoint, among rural people, and because of the physiological importance to the child of a good breakfast. To determine what our situation actually was, before the public education activity started, a survey of 6,511

TABLE I

Survey of Foods Eaten at Breakfast by Delaware School Children

	6,511 White and Colored Pupils		*5,308 White Pupils*		*1,203 Colored Pupils*	
Foods	*No. of Pupils*	*Per-centage*	*No. of Pupils*	*Per-centage*	*No. of Pupils*	*Per-centage*
No breakfasts	130	2	86	1.6	44	4
Milk—1 glass or more	2,448	38	2,379	45	69	6
Eggs	1,802	26	1,557	29	245	20
Cereal—						
Cooked	2,226	34	1,786	34	440	37
Ready-to-serve	1,317	20	1,209	23	108	9
Fruit—						
Fresh	947	15	826	16	121	10
Canned	221	3	183	3	38	3
Dried	53	0.8	50	1	3	0.2
Syrup	352	5	318	6	34	3
Preserves	398	6	316	6	82	7
Bread—						
White	2,050	31	1,584	30	466	39
Dark	21	0.3	....	..	21	1
Biscuits	491	8	334	6	157	13
Pancakes	933	14	856	16	77	6
Toast	1,398	21	1,283	24	115	10
Potatoes	551	8	271	5	280	23
Meat (chiefly bacon, scrapple, sausage and ham)	1,414	22	1,119	21	295	24
Cocoa	939	14	844	16	295	24
Coffee	206	3	193	4	13	1

school children's breakfasts was made by the Dental Hygienists of the State Board of Health. It was done quietly, in the course of their routine conversation with the individual child, apart from the others. We believe it to be as accurate as such a survey could be. A summary of findings is available to you here at this meeting (Table I).

About half these breakfasts were inadequate, either in quality or in kinds of food necessary for good nutrition. For example, 46 per cent contained no cereal, 63 per cent contained no milk apart from that used on the cereal, 82 per cent contained no fruit, and 2 per cent of the children had come to school with no breakfast at all. On the basis of these figures, together with the knowledge of the Extension Service as to other meals, and our physical findings as to the Delaware school child's general and dental condition (*e.g.* 88 per cent dental caries), we felt justified in telling the people of Delaware that every other school child was probably, to some extent, malnourished.

Fifteen portable scales, furnished by the Delaware Anti-Tuberculosis Society, were distributed to rural schools isolated from stores where scales are available. Food records, as well as weight records, were kept by teacher and pupil. They stimulated the interest of teacher, parent, and child in the child's own health, and in the importance of food with relation to it. Three hundred sixteen pupils enrolled. The food intake for a complete week at the start, as contrasted with a week at the end, showed better breakfasts in one-third of the records through increased use of milk, eggs, and fruit. Teachers said they noticed improvement in health, and with it, improvement in studies and behavior. The veracity of such reports is always open to question, but they may at least be taken to indicate that health ideas were planted.

The axiom upon which this whole program was conducted was: The health of people varies according to the food they eat. We told the public, "The growth of children, their disposition, their posture, the condition of their teeth are all directly affected by the kind of food they eat and the way they live. When children are properly fed, they are better able to resist or throw off sickness. Also, success in their daily school work is conditioned by their daily food."

It should be noted here that this demonstration was made possible through the funds available to Delaware by the Social Security Act, through the Children's Bureau of Washington, and that Kent County was chosen, as the act requires, as a "predominantly rural area, an area of special economic distress."

As the program has proceeded, there has been an attitude of increasing interest in nutrition in relation to health among school authorities, teachers, community groups, and the laity in general. There has been general public amazement at the results of the breakfast survey, particularly at the unexpectedly small differences between the findings among the colored and among the white.

Continuation of the work is planned. It is to be intensified and enlarged, particularly with regard to the school lunch, and is to include another county, where similar health and economic conditions prevail. One method of extending it will be through the training in nutrition of local health chairmen and leaders of local groups, and then inducing them to reach individual families outside of, as well as within, these groups. A second will be through the associations of producers and distributors of the protective foods which their neighbors are too meagerly consuming —the dairymen, poultrymen, canners, vegetable and fruit growers, and

grocers. Delaware can produce enough of the protective foods so that none of her children need suffer from lack of them. We deliberately employ sensationalism and say that Delawareans are half-starving in the midst of plenty.

Results are expected to lag. It is felt that to change the eating habits of a people is nearly as difficult as to change their religion.

On the other hand, we are convinced that a state board of health can do no more fundamental service toward long-run improvement of the health of future generations than to develop an understanding of the value of a good diet. We believe Dr. Sherman's motto, quoted in the front of our booklet: "An optimum diet would add not only years to one's life, but life to one's years."

SUMMARY

A program of public education in the dietary improvement of health was conducted during the 1936–1937 school year in Kent County, Dela. The public was reached through posters, news stories, meetings, demonstrations, and circular letters. Emphasis was laid on breakfasts. A survey of 6,511 school children's breakfasts showed half to be inadequate.

Beware of Hollandaise Sauce

WITHIN the past few years Hollandaise sauce has been implicated in several outbreaks of food poisoning in Baltimore and elsewhere in the United States. Where investigated it was revealed in many instances that the sauce involved in the outbreaks contained bacteria which were capable of producing the offending toxin. Unlike some other forms of food poisoning it seems that this special type may appear at any season of the year, in warm weather or in cold.

Hollandaise sauce is one of the few foods that can neither be successfully refrigerated to retard the growth of bacteria nor heated in order to kill off the organisms. This is because refrigeration hardens the butter in the sauce and causes it to become solid, while heating the sauce coagulates the eggs and causes the mixture to become lumpy. In either process the commodity is rendered unsuitable for serving, so that this product needs to be eaten very promptly after it is made. . . . —*Baltimore Health News*, Baltimore Health Department, April, 1938.

A Tabular Outline for Use in Reporting Hospital Morbidity*

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ESSENTIAL to any comprehensive system of keeping account of diagnoses in the record rooms of hospitals is provision for a tabular summary of such diagnoses, of the sort that may be made for annual reports. In a previous article [1] I discussed the relationship of this function to other purposes which must be considered, and described a scheme for adapting the whole system to punch cards. Here I shall deal only with an amplification of that part of the subject which deals with the matter of the enumeration of diagnoses in tabular form.

Much discussion of the question of indexing medical diagnoses is needlessly confused because of failure to distinguish between a number of different problems involved. There is, for instance, the consideration of "nomenclature." Whether a pathologic condition should be called "pernicious anemia," "idiopathic anemia," "hyperchromic microcytic anemia," or "Addison's disease"; whether another condition shall be designated "melanotic carcinoma," "melanotic sarcoma" or "melanoma"; whether, "lymphadenitis" is an acceptable term—are all important questions in relation to the science of nosology. They are not essential, however, if the task is that of enumerating the individuals suffering from those conditions. There is, again, the subject of *classification* of disease, which also is not a central consideration for the systematic enumeration of diagnoses. Classification is a *scientific* enterprise which proceeds in strictly logical fashion according to some defined, descriptive principle (*e.g.*, "anatomic," "etiologic," "symptomatic"). It deals essentially with the abstract concepts of diseases rather than what is observed in individuals who are subject to them. The disease entity "carcinoma" may be logically divisible into the classes adenocarcinoma and epithelioma; and so far as the science of taxonomy is concerned, these two mutually exclusive classes may be exhaustive. But for statistical enumeration, there will have to be a place for patients with the diagnosis of "carcinoma" (*i.e.*, unknown with regard to whether glandular or epithelial) as well as for "neoplasm" (*i.e.*, unknown with regard to whether carcinoma or sarcoma). On the other hand, for purposes of enumeration a single principle in the ordering of the tabular categories is not a *sine qua non*.

These rather elementary observations are made to forestall hundreds of questions that one may hear discussed when the indexing of diagnoses is the subject;

* Read before the Vital Statistics Section of the American Public Health Association at the Sixty-sixth Annual Meeting in New York, N. Y., October 5, 1937.

but they do *not* concern us here and it will be well to exclude them explicitly from our present consideration.

What we *are* concerned with is the practical problem of providing an outline in terms of which an enumeration of diagnoses can be made and one that will be satisfactory for *statistical* purposes. A list of rubrics which will be satisfactory in that sense should have certain characteristics: (1) The individual rubrics should be sufficiently broad to make possible the assignment of diagnoses, even if not made with great refinement, yet narrow enough to be usefully discriminating. (2) The number of such rubrics or classes should be reasonably short.

Bolduan has discussed the value that a uniform system of reporting hospital morbidity might have for enlightening questions of interest to public health. In the Division of Biometry and Medical Statistics of The Mayo Clinic we have for the last several years struggled with the problem, with the practical objective of providing a tabular outline that would furnish a reasonably simple and consistent statement of the diagnoses made annually. After considerable experimentation we decided to use as a basis for our outline the International List of Diseases and Causes of Death,[3] for the reason that that set of rubrics has the widest current use for purposes of statistical enumeration.* However, since our aim was to report morbidity, not mortality, it was necessary to modify it. Certain of the entries in the *International List* refer necessarily only to deaths such as "homicide" and "violent deaths." Other entries had to be changed because they were not as clear or specific as necessary. In still other cases, when the entries of mortality were translated into diagnoses of morbidity there resulted an overlapping of designations. We therefore modified the entries, but in doing this we proceeded on the principle that the original arrangement and designations be disturbed as little as possible, and in each instance only for definite reasons. In this way we hoped to preserve, so far as was possible and consistent with the purposes in hand, the facility of comparing statistics of morbidity with statistics of mortality, as reported in terms of the *International List*. Yet, for our list a rather considerable number of modifications had to be made. We have now used this set of rubrics for the tabulation of the experience of three successive years, and more than 300,000 diagnoses have been assigned according to it. Yet it is not to be considered as a finished product. In response to repeated requests we are publishing this list now and it is to be hoped that it will be tried by a number of representative hospitals. It would be highly desirable if the experiences of different hospitals were accumulated and from the assembled experience a list to be developed which could be adopted as standard.

The set of rubrics is given in Table I, together with code numbers which can be used in a three-column punch card code or which can be translated into a single-column multiple-punch code. It will be noted that unused numbers are interspersed liberally in the code for additional entries. In parentheses to the right of the entries are given the numbers of the *International List*[4] which correspond to the rubrics of The Mayo Clinic List. Since a number of the classes of the *International List* have been considerably subdivided and rearranged, various of The Mayo Clinic rubrics correspond to particular diagnoses that may be found in several rubrics of the *Inter-*

* Other individuals, I am aware, have made up similar lists. Specifically, Selwyn D. Collins of the U. S. Public Health Service has used a list, which is a modification of the *International List of Causes of Death*, for the summarizing of morbidity surveys. But the List of The Mayo Clinic is specifically adapted to hospital morbidity, and moreover has had a trial for several successive years.

national List. The outline is not, of course, a list of diagnoses but a list of rubrics into which diagnoses are fitted, though in particular places a rubric may correspond to a single specific diagnosis. It is essentially a statistical and practical instrument, not a guide for scientific diagnosis or an authority for proper medical nomenclature. In practical application there is used in conjunction with the outline of rubrics an index of diagnoses. Here are arranged, alphabetically, detailed diagnoses with the code numbers corresponding to the rubrics to which they belong, and in this index are incorporated decisions as to the disposition of diagnoses which, from a consideration of the outline alone, would be equivocal.

TABLE I

Tabular Outline of Rubrics for General Morbidity Reports in Hospitals, Mayo Clinic, Rochester, Minn.

I. INFECTIOUS AND PARASITIC DISEASES

Mayo Clinic Code

002 Typhoid fever (1)
003 Paratyphoid fever (2)
004 Typhus fever (3)
005 Relapsing fever (4)
006 Undulant fever (5)
007 Smallpox (6)
008 Measles (7)
009 Scarlet fever (8)
010 Whooping cough (9)
011 Diphtheria (10)
012 Influenza (respiratory) (11a)
013 Cholera (12)
014 Dysentery, amebic (13a)
015 Dysentery, bacillary (13b, c)
016 Plague (14)
017 Erysipelas (15)
020 Acute poliomyelitis and acute polioencephalitis (16)
021 Lethargic or epidemic encephalitis (17)
024 Glanders (19)
025 Anthrax (*Bacillus anthracis*) malignant pustule (20)
026 Rabies (21)
027 Tetanus (22)
030 Tuberculosis, respiratory system (23)
032 Tuberculosis, meninges and central nervous system (24)
035 Tuberculosis, gastro-intestinal tract (25, 31)
037 Tuberculosis, vertebral column (26)
040 Tuberculosis, bones, except vertebral column (27a)
042 Tuberculosis, joints, except vertebral column (27b)
045 Tuberculosis, skin (28)
047 Tuberculosis, genito-urinary system, male (30)
048 Tuberculosis, genito-urinary system, female (30)
050 Tuberculosis, eye (31)
052. Tuberculosis, e.e.e.* (29, 31, 32)
055 Leprosy (33)
065 Syphilis, primary (34)
075 Syphilis, secondary (34)
080 Syphilis, tertiary, skin (34)
081 Syphilis, tertiary, vascular (34)
082 Syphilis, tertiary, eye (34)
083 Syphilis, tertiary, bone (34)
084 Syphilis, tertiary, central nervous system, e.e.e. (34)
085 Syphilis, tertiary, e.e.e. (34)
095 Syphilis, congenital (34)
105 Syphilis investigated, serology positive (34)
106 Syphilis, e.e.e. (34)
112 Gonococcus infection, joints (35)
113 Gonococcus infection, genito-urinary organs, male (35)
114 Gonococcus infection, genito-urinary organs, female (35)
115 Gonococcus infection, eye (35)
116 Gonococcus infection, e.e.e. (35)
121 Venereal disease, e.e.e. (35)
123 Septicemia (36)
126 Yellow fever (37)
127 Malaria (38)
132 Diseases due to protozoal parasites, e.e.e. (39)
134 Ankylostomiasis (40)
137 Hydatid cysts (41)
140 Diseases caused by helminths, e.e.e. (42)
141 Actinomycosis (43)
145 Mycoses, e.e.e. (43)
146 Chickenpox (44a)
147 German measles (44b)
148 Mumps (44c)
152 Infectious and parasitic diseases, e.e.e. (44c)

II. NEOPLASMS

154 Neoplasm, malignant, lip, (45)
156 Neoplasm, malignant, tongue (45)
159 Neoplasm, malignant, salivary glands (45)
162 Neoplasm, malignant, buccal cavity and pharynx, e.e.e. (45)
165 Neoplasm, malignant, esophagus (46)
169 Neoplasm, malignant, stomach (46)
172 Neoplasm, malignant, small intestine (46)
175 Neoplasm, malignant, large intestine, except rectum (46)
177 Neoplasm, malignant, rectum (46)
180 Carcinomatosis, abdominal (46)
183 Neoplasm, malignant, pancreas (46)
185 Neoplasm, malignant, gallbladder and ducts (46)
188 Neoplasm, malignant, liver (46)
193 Neoplasm, respiratory system (47)
196 Neoplasm, malignant, uterus (48)
199 Neoplasm, malignant, ovary (49)
202 Neoplasm, malignant, genito-urinary organs, female, e.e.e. (49, 53)
205 Neoplasm, malignant, breast (50)
210 Neoplasm, malignant, testicle (51)
213 Neoplasm, malignant, prostate (51)
216 Neoplasm, malignant, adrenal gland (51, 53)
219 Neoplasm, malignant, kidney (51, 53)
221 Neoplasm, malignant, bladder (51, 53)
224 Neoplasm, malignant, genito-urinary organs, male, e.e.e. (51)
227 Neoplasm, malignant, skin, e.e.e. (52)
230 Neoplasm, pituitary (53, 54e, 55e)

* e.e.e. means except elsewhere enumerated.

232 Neoplasm, brain, including cranial nerves, e.e.e. (53, 54d, 55d)
235 Neoplasm, spinal cord (53, 54e, 55e)
237 Sarcoma, bone, any part of body (53)
244 Hemangio-endothelioma and Lymphangio-endothelioma, except brain or spinal cord (53)
247 Neoplasm, malignant, thyroid (53)
250 Neoplasm, eyeball and orbit (53, 54e, 55e)
255 Melanocarcinoma, e.e.e. (53)
257 Neoplasm, malignant, e.e.e. (53)
263 Fibroma, uterus (54b)
268 Endometrioma (54b, c)
271 Polyp, female genital tract (54b, c)
274 Neoplasm, nonmalignant, abdominal or pelvic, female, e.e.e. (54b, 55b)
276 Adenoma, prostate (137)
278 Neoplasm, nonmalignant, skin (54e)
279 Lipoma (54e)
281 Hemangioma and lymphangioma (54e)
287 Neoplasm, nonmalignant, bone (54e)
290 Neoplasm, nonmalignant, breast (54e)
295 Polyp, gastro-intestinal tract (54e)
298 Polyp, nose (54e)
299 Neoplasm, nonmalignant, respiratory system, e.e.e. (54e)
300 Von Recklinghausen's disease (neurofibromatosis) (54e)
303 Neoplasm, nonmalignant, nerve, e.e.e. (54e)
306 Neoplasm, e.e.e. (53, 54e, 55e)
310 Neoplasm, follow-up examination

III. RHEUMATIC DISEASES, NUTRITIONAL DISEASES, DISEASES OF THE ENDOCRINE GLANDS, AND OTHER GENERAL DISEASES

312 Acute Rheumatic fever (56)
317 Rheumatism, e.e.e. (57)
320 Gout (58)
322 Diabetes mellitus (59)
325 Diabetes, e.e.e. (69)
327 Scurvy (60)
330 Beriberi (61)
332 Pellagra (62)
335 Rickets (63)
340 Acromegaly, without pituitary tumor specified (65)
342 Hypopituitarism (65)
345 Diseases of the pituitary body, e.e.e. (65)
348 Adenoma, toxic, thyroid (66a)
349 Adenoma, nontoxic, thyroid (66a)
350 Exophthalmic goiter (66b)
353 Goiter, e.e.e. (66e)
355 Myxedema (66c)
358 Cretinism (66c)
361 Tetany, parathyroid (66d)
363 Tetany, e.e.e. (66d)
366 Diseases of the thyroid and parathyroid glands, e.e.e. (66e)
371 Addison's disease (31, 68)
373 Dysfunction, ovarian (139b)
375 Endocrine disturbances, e.e.e. (69)
376 Obesity (69)

IV. DISEASES OF THE BLOOD AND BLOOD-MAKING ORGANS

377 Purpura (70a)
380 Hemophilia (70b)
382 Pernicious anemia (71a)
388 Anemia, e.e.e. (71b)
391 Leukemia (72a)
393 Lymphosarcoma (72b)
396 Hodgkin's disease (72b)
399 Banti's disease (73)
404 Diseases of the spleen, e.e.e. (73)
407 Polycythemia vera (74)
410 Agranulocytosis (74)
413 Diseases of the blood and blood-making organs, e.e.e. (74)

V. POISONINGS AND INTOXICATIONS

416 Alcoholism (75)
418 Poisoning, by inhalation gas (178)
423 Poisoning, lead (77a)
425 Poisoning, e.e.e. (77b, c)

VI. DISEASES OF THE NERVOUS SYSTEM AND OF THE ORGANS OF SPECIAL SENSE

428 Encephalitis, e.e.e. (78)
430 Abscess, brain (78)
433 Meningitis, e.e.e. (18, 79a, b)
436 Progressive locomotor ataxia (tabes dorsalis) (80)
439 Charcot joint (80)
442 Amyotrophic lateral sclerosis and combined sclerosis (81)
445 Progressive muscular atrophy (81)
448 Progressive muscular dystrophy (81)
451 Syringomyelia (not associated with tumor) (81)
454 Multiple sclerosis (87b)
457 Friedreich's ataxia (81)
459 Ataxia, Marie's (81)
462 Paralysis and other residuals of cerebral hemorrhage (82a)
466 Paralysis, central nervous system, e.e.e. (87b)
470 Paralysis, peripheral nerves (87b)
472 Diseases of the Spinal Cord and Brain, e.e.e. (81)
475 Aneurysm, brain (96)
478 Cerebral embolism and thrombosis, acute, e.e.e. (82b)
481 General paralysis of the insane (83)
483 Dementia praecox and other psychoses (84, 87b)
486 Neuroses, minor (functional complaints) (87b)
489 Epilepsy, except Jacksonian (85)
491 Trigeminal neuralgia (87a)
492 Paralysis, facial (82d)
493 Paralysis, cranial nerves, e.e.e. (82d)
494 Neuralgia and neuritis, e.e.e. (87a)
497 Chorea, Huntington's (87b)
499 Chorea, except Huntington's (87b)
505 Idiocy (87b)
507 Migraine (87b)
511 Diseases of the nervous system, e.e.e. (86, 87b)
515 Glaucoma (88)
517 Cataract (88)
520 Amaurosis (88)
523 Trachoma (88)
525 Errors of refraction (88)
527 Diseases of the organs of vision, e.e.e. (88)
529 Otitis media (89a)
530 Deafness (87b, 89a)
532 Ménière's disease (89a)
535 Diseases of the ear, e.e.e. (89a)
538 Diseases of the mastoid process (89b)

VII. DISEASES OF THE CIRCULATORY SYSTEM

542 Rheumatic heart disease (56, 92, 93, 95b)
545 Hypertensive heart disease (95b)
548 Subacute bacterial endocarditis (92a)
550 Angina pectoris (94a)
551 Coronary embolism and thrombosis (94b)
553 Diseases of the heart, e.e.e. (90, 91, 92, 93, 94, 95)
555 Vascular aneurysm, e.e.e. (96)
558 Arteriosclerosis, e.e.e. (97)
563 Raynaud's disease (98)
566 Thrombo-angiitis (99)
568 Diseases of the arteries, e.e.e. (99)
571 Phlebitis (100)
573 Hemorrhoids (100)
576 Varicose veins (100)
578 Diseases of the veins, e.e.e. (100)
581 Lymphangitis (101)
583 Hypertension, essential (102)
586 Hypertension, e.e.e. (102)
588 Anomalies of the blood pressure, e.e.e. (102)
592 Diseases of the Circulatory system, e.e.e. (103)

VIII. DISEASES OF THE RESPIRATORY SYSTEM

595 Rhinitis, vasomotor (104a)
598 Rhinitis, except vasomotor (104a)
601 Diseases of the nasal fossae and annexa, e.e.e. (104)
603 Sinusitis (104b)
605 Laryngitis (105)
608 Diseases of the larynx, e.e.e. (105)
610 Bronchitis (106)
613 Bronchopneumonia (107a)
615 Lobar pneumonia (108)
619 Pneumonia, e.e.e. (109)
622 Pleurisy (110)
624 Pulmonary embolism and thrombosis (111a)
627 Pulmonary edema (111b)
629 Asthma (112)
631 Pulmonary emphysema (113)
634 Abscess, lung (114b)
637 Diseases of the respiratory system, e.e.e. (114a, 114b)

IX. DISEASES OF THE DIGESTIVE SYSTEM

640 Vincent's angina (115a)
643 Tonsillitis (115a)
646 Diseases of the pharynx, e.e.e. (115a)
648 Infected or impacted teeth (115b)
649 Parotitis, e.e.e. (44c)
653 Diseases of the buccal cavity and annexa and lip, e.e.e. (115b)
655 Stricture, esophagus (116)
657 Diverticulum, esophagus (116)
660 Diseases of the esophagus, e.e.e. (116)
662 Ulcer, stomach (117a)
664 Ulcer, duodenum (117b)
666 Ulcer, jejunum (123)
668 Peptic ulcer, not specified as to location (123)
670 Dyspepsia (118)
673 Cardiospasm (118)
675 Diseases of the stomach, e.e.e. (118)
678 Colitis, ulcerative (120)
681 Diarrhea and enteritis, e.e.e. (119, 120)
684 Appendicitis (121)
687 Hernia, inguinal (122a)
689 Hernia, abdominal (122a)
692 Hernia, diaphragmatic (122a)
694 Hernia, femoral (122a)
697 Hernia, vaginal (122a)
701 Hernia, intestinal, e.e.e. (122a)
703 Diseases of the anus and rectum, e.e.e. (123)
706 Intestinal obstruction (122b)
710 Diseases of the intestines, e.e.e. (123)
712 Cirrhosis of the liver, specified as alcoholic (124a)
715 Cirrhosis of the liver, not specified as alcoholic (124b)
717 Yellow atrophy of the liver (125a)
720 Diseases of the liver, e.e.e. (125b)
722 Biliary calculus (126)
725 Cholecystitis (127)
729 Diseases of the gallbladder and biliary passages, e.e.e. (127)
731 Diseases of the pancreas, e.e.e. (128)
734 Peritonitis, e.e.e. (129)
736 Subphrenic abscess (129)

X. DISEASES OF THE GENITO-URINARY SYSTEM

744 Nephritis, e.e.e. (130, 131, 132)
746 Displaced kidney (133)
749 Purulent infection, kidney (133)
751 Polycystic kidney (133)
755 Diseases of the kidneys and ureters, e.e.e. (133)
756 Renal calculus (134)
758 Ureteral calculus (134)
761 Vesical calculus (134)
767 Cystitis (135)
770 Fistula, bladder (135)
774 Diseases of the bladder, e.e.e. (135)
776 Stricture, urethra (136a)
780 Diseases of the urethra, e.e.e. (136b)
781 Diseases of the urinary system, e.e.e. (136b)
782 Calculus, prostate (137)
786 Prostatitis (137)
788 Diseases of the prostate, e.e.e. (137)
791 Orchitis (138)
796 Diseases of the male genital organs, e.e.e. (138)
805 Diseases of the ovaries and diseases of the tubes and parametrium, e.e.e. (139a, b, c, e)
807 Conditions of endometrium, e.e.e. (139c)
810 Malposition, pelvic organs, female (139c)
816 Multiple pelvic diseases, female (139a, b, c, e)
820 Diseases of the uterus, e.e.e. (139c)
821 Menopause (139c)
825 Mastitis (139d)
829 Nonpuerperal diseases of the breast, e.e.e. (139d)
831 Vaginitis (139e)
835 Diseases of the female genital organs, e.e.e. (139e)

XI. DISEASES AND CONDITIONS OF PREGNANCY, CHILDBIRTH AND PUERPERAL STATE

838 Abortion (140. 141)
843 Ectopic pregnancy (142a, b)
847 Pregnancy, e.e.e., with parturition here (143)
848 Pregnancy, e.e.e., with parturition elsewhere (143)
851 Placenta praevia (144a)
853 Puerperal Hemorrhages, e.e.e. (144b)
855 Puerperal septicemia and pyemia (145a)
858 Eclampsia (146)
860 Toxemia of pregnancy, e.e.e. (147)
863 Puerperal phlegmasia alba dolens, embolus, or phlebitis (148)
865 Conditions of the puerperal state, e.e.e. (145b, 150)

XII. DISEASES OF THE SKIN

868 Furuncle, carbuncle, acute inflammation skin (151, 152)
873 Herpes (153)
875 Pemphigus (153)
878 Scleroderma (153)
882 Diseases of the skin, e.e.e. (153)

XIII. DISEASES OF THE BONES AND ORGANS OF LOCOMOTION

885 Osteomyelitis (154)
887 Paget's disease, bone (155)
890 Fracture, acute, skull (194b)
894 Fracture, acute, bone, e.e.e. (194b)
895 Fracture, old, any bone (155)
905 Diseases of the bones, e.e.e. (155)
908 Arthritis, e.e.e. (156a)
910 Dislocation, joint (156a)
913 Sacro-iliac disease (156a)
916 Diseases of the joints, e.e.e. (156a)
918 Myasthenia gravis (156b)
921 Bursitis (156b)
923 Myositis ossificans (156b)
926 Talipes, acquired (156b)
928 Torticollis (156b)
931 Dupuytren's contracture (156b)
935 Diseases of the organs of locomotion, e.e.e. (156b)

XIV. CONGENITAL MALFORMATIONS

938 Hydrocephalus (157a)
940 Spina bifida and meningocele (157b)
943 Congenital malformations of the heart (157c)
945 Branchial cyst (157d)

948 Congenital talipes (157d)
950 Harelip (157d)
953 Hirschprung's disease (157d)
955 Hypospadias (157d)
956 Undescended testicle (157d)
957 Congenital malformations, genito-urinary system, e.e.e. (157d)
958 Imperforate anus (157d)
961 Congenital defects, e.e.e. (157d)

XV. DISEASES AND CONDITIONS OF EARLY INFANCY

963 Normal birth
965 Premature birth (159)
966 Stillbirth
967 Injury at birth, in new born (160)
969 Atelectasis, in new born (161a)
971 Icterus of the new born (161b)
974 Diseases peculiar to early infancy, e.e.e. (158, 161c, d)

XVI. SENILITY

976 Senility (162)

XVII. INJURIES

986 Injuries by animals (176, 188)
988 Injuries, acute, e.e.e. (184–214)
989 Injuries, old (posttraumatic and postsurgical conditions included)
990 Foreign body, bronchus or digestive tract, including larynx and lung (194a)
992 Foreign body, e.e.e. (194a)

XVIII. MISCELLANEOUS

994 Follow-up examination, postoperative, except neoplasm—310
995 Diseases, e.e.e. (69)
996 Hospital investigation
997 Negative general examination
998 No diagnosis or incomplete examination
999 Confidential file

TABLE II

General Summary
Diagnoses in 1936
Total Patients 65,097

Diagnoses	*Patients*			
	Total	*Non-Surgical*		*Surgical*
		Out Patient	*Hospital*	
I Infectious and Parasitic Diseases				
Typhoid fever	2		2	
Paratyphoid fever	2	2		
Undulant fever	19	13	6	
Measles	8	8		
Scarlet fever	49	28	21	
Whooping cough	17	17		
Diphtheria	3		3	
VII Diseases of the Circulatory System				
Rheumatic heart disease	251	212	36	3
Hypertensive heart disease	674	434	237	3
Subacute bacterial endocarditis	21	6	14	1
Angina pectoris	734	636	97	1
XVIII Miscellaneous				
Check-up examination, post-operative, except neoplasm	989	898	37	54
Diseases, e. e. enumerated	2,017	1,703	177	137
Hospital investigation	751		626	125
Negative general examination	1,702	1,702		
No diagnosis or incomplete examination	2,847	2,847		

In making our reports we do not attempt to select from among several simultaneous diagnoses a single "primary" one to be reported, but the same diagnosis is not assigned more than once to a particular patient in any one year, regardless of the number of visits or hospitalizations. In principle there is no limit to the number of simultaneous different diagnoses that may be enumerated; in practice, comparatively trivial diagnoses are not reported and overlapping diagnoses are combined into unit diagnoses referable to a single, definite condition. The cases in each rubric are reported in terms of the total number of patients, and, of these, the number of outpatients, the number hospitalized surgically, and those hospitalized nonsurgically. The form of a report is given in Table II.

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Nursing Service Honored

AT the opening session of the National Nursing Biennial Convention, held in the Municipal Auditorium, Kansas City, Mo., April 25, the Walter Burns Saunders Memorial Medal was presented to Helen McDonough, of Pittsburgh, Pa., Chairman of the Private Duty Section of the American Nurses' Association, as representative of all bedside nurses. Dr. Loyal Davis, professor of surgery at North Western University Medical School, Chicago, Ill., made the award.

The recipient of the medal is decided upon by a Committee of Awards, composed of the presidents of the three national nursing organizations — the American Nurses' Association, the National League of Nursing Education, and the National Organization for Public Health Nursing—and of W. L. Saunders of Philadelphia, in memory of whose father the medal is presented at each Biennial Nursing Convention.

The Acute Diarrheal Disorders*

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OUR anxieties and activities as public health workers appear to be the product of two influences—public concern vigorously expressed, and our own convictions as to the relative importance of various problems. For the former reason epidemic diarrheal diseases demand our attention. The outbreaks are explosive in character, often widely distributed, and the ailments are distressing. A satisfactory explanation and effective preventive measures are demanded. Under these circumstances there is but slight consolation in the knowledge that the epidemic diarrheal disorders are commonly of short duration and rarely hazardous to life. We are, and we must be, concerned with these outbreaks, but we must also evaluate accurately the relative importance of the epidemic and endemic diarrheal disorders.

The study which provides much of the data of this report is being conducted in Bernalillo County, N. M., and adjacent Indian communities, an area with an estimated population of 55,000. During July and August, 1937, there occurred among infants and young children within this region 57 reported deaths from the acute diarrheal disorders. This represents the results of an endemic disease. Though such a high incidence of these conditions is unusual in this country, it remains true that in 1934 a total of 26,584 deaths in the United States were attributed to "diarrhea and enteritis" and "dysentery." Further, it is readily established that for each fatality there occur several severe cases of non-fatal diarrheal disease in the young or aged, and an even larger number of milder disorders involving older children and younger adults.

Though varying widely in frequency, these are disorders familiar to all areas. They warrant and should now receive the same persistent interest and attention which has already been given with such gratifying effect to typhoid fever.

CLINICAL CONSIDERATIONS

For general clinical purposes the diarrheal diseases may be separated into two groups, those due to proliferative and non-proliferative agents; that is, the infectious and non-infectious disorders. If the latter result from a single ingestion of irritating substance, the condition will persist only for the few hours necessary to evacuate the intestinal tract. The severity will be dependent upon the magnitude of the dose of offending material. The familiar member of this group is staphylococcal food poisoning. Occasionally there is a repeated ingestion of small doses of

* Read before a Joint Session of the Public Health Engineering and Epidemiology Sections of the American Public Health Association at the Sixty-sixth Annual Meeting, October 7, 1937.

toxic material. Clinically these cases can be identified with difficulty, if at all. In outbreaks of this type the diagnostic problem rests chiefly with the epidemiologist. Other varieties of non-infectious diarrheas tend to be milder but more persistent. These may be dependent on dietary factors, as the daily ingestion of excessive carbohydrates by infants and excessive roughage by adults. Constitutional influences may also be concerned—allergic idiosyncrasies, psychic or neurological instabilities, or structural abnormalities. These are the concern of the practising physician whose duty it is to study the peculiar needs of single individuals. No further attention will be given at this time to these clinical entities.

For purposes of this discussion, the infectious diarrheas are defined as those due to the presence and multiplication of microörganisms within the lumen or wall of the intestinal tract. Whether these produce damage by the elaboration of toxic products or by parasitic growth in or on the walls of the tract is of secondary importance. Clinically these disorders tend to begin rather suddenly. The healthy individual as a rule first notes mild abdominal distress followed in a few hours by frequent evacuations and increasing pain. The temperature may or may not become elevated. The stools may or may not become bloodstained. Pus cells may usually be observed but are not always present. In severity and course these disorders are most variable. They may be merely transient and mild annoyances, they may run a stormy and protracted course, or they may be fulminating fatal illnesses.

The differential clinical diagnosis of the diarrheal disorders presents unusual difficulties. There is but one outstanding symptom—diarrhea—and this may arise from a wide variety of causes. The associated complaints, such as nausea, vomiting, and abdominal pain, are few and have practically no differential value. Physical examination usually reveals little other than the signs of dehydration and some abdominal tenderness. Of some diagnostic significance are the temperature and character of the evacuations, but even these provide uncertain evidence as to etiology. In studying series of cases, the clinical course of the disease and the epidemiological observations provide indications valuable for diagnosis. Utilizing all of these data, we have concluded that the greater proportion, well over 90 per cent, of diarrheal disorders observed in our studies were acute enteric infections. Further than this it was impossible to go without the evidence presented by laboratory studies.

In considering the usual clinical classification and descriptions of the diarrheal diseases, it must be remembered that heretofore with few exceptions only cases severe enough to be hospitalized have been examined etiologically. Thus it has come about that bacillary dysentery has been observed as a serious disease characterized by sudden onset, with fever, abdominal pains, and the frequent passage of bloody muco-purulent stools. Field studies involving the etiological examination of diarrheas of all degrees of severity rapidly reveal an amazing variability in the clinical manifestations of bacillary dysentery, as is also true in amebiasis. The common error of the past has been to consider specific infections only in severer diarrheal disorders. We must carefully avoid this mistake in future.

ETIOLOGICAL STUDIES

That diagnostic laboratory studies of the diarrheal diseases have a proper and important place in the public health program has been both demonstrated and stated by several workers. For various reasons this remains a procedure

called for but infrequently and advocated but rarely. As illustrative of the productiveness of these examinations, let us state our own experience in the study in New Mexico. The positive findings reported include only the already identified strains. It is expected that the further study of additional and less typical organisms will increase somewhat the proportion of positives.

In the first 1,000 stool specimens examined culturally following July 1, 1937, 398 were submitted for the diagnosis of diarrheal disorders. The remainder were studied for epidemiological reasons. Of the diagnostic specimens, 147 (36.9 per cent) yielded organisms of the genus Shigella. Excluding cases in which but one stool was submitted and found to be negative, we examined for diagnostic purposes during July and August a total of 192 persons. From 128 (62.5 per cent) of these, *S. dysenteriae* were isolated. Further, of 22 fatal cases studied during the same period, 17 (77.3 per cent) yielded *S. dysenteriae*. Only 3 of the 5 negative fatal cases had as many as the minimum of 3 specimens considered essential for reasonably reliable diagnosis. Any test for a communicable disease which yields this proportion of positives, or even much less, is amply justified.

That stool cultures for diarrheal disorders are productive is clearly apparent, but even more evident are the difficulties involved in a satisfactory application of this procedure. Here we have to deal not with one organism of relatively constant characteristics, as in typhoid fever, but at least two families of organisms, the Shigella and Salmonella, each with several members varying in type, and with many strains readily tending to reveal varying characteristics in different environments.

We have already found that there is unusual importance in the selection of laboratory procedures. During 1936, we employed our then favorite medium, eosin-methylene-blue agar. Due to a limited supply of glassware we were restricted to 2 plates per specimen. This year we added 3 other differential media, using now a total of 4 plates per specimen. The proportion of positives found among diagnostic specimens has been more than doubled with a resulting increase of more than 50 per cent in the proportion of positive cases. A small part of this change may possibly be attributed to the influence of experience. A little more may be due to the fact that in 1936 few other cases than those in infants were examined, whereas in 1937 a number of illnesses in adults were reported and usually found positive for *S. dysenteriae*. That these influences are of negligible importance seems apparent since in 114 (57 per cent) of the first 200 positive specimens this year the organisms were found only on 2 of the types of media newly employed. By far the best results have been obtained on desoxycholate citrate agar. This yielded the organisms in 166 (83 per cent) of the 200 positives. The proportions of the other 3 media which yielded positives were plain desoxycholate agar, 33.7 per cent, Endo's agar 30.2 per cent, and eosin-methylene-blue agar 26.5 per cent. The relative value of these media for the isolation of the Sonne variety of *S. dysenteriae* is not yet reliably indicated in our study, but even for this the desoxycholate citrate agar apparently yields quite as good results as the other media employed. The importance of selecting the best laboratory procedures available is evident. Is it not also likely that further advances in the study of the diarrheal diseases may be made if technics are examined critically and revised or devised specifically for these disorders?

That the Flexner and Sonne varieties of *S. dysenteriae* are the major cause of the acute diarrhea in this country

has been as certainly demonstrated in other areas as in New Mexico—for example, in Henrico County, Va., by McGinnis,[1] and in Los Angeles by Kessel.[2] It seems equally clear that other organisms do give rise to infectious diarrhea.* Occasionally we have been able to incriminate one of the Salmonella group and very rarely *Eberthella typhi*. It seems probable that still other organisms are involved but definite incriminating evidence is difficult to obtain and continues to be lacking.

That the etiology of the diarrheal diseases may vary as markedly in different areas, as does the incidence, seems possible. However, our own experience forces us to conclude that the most effective approach to these disorders is to use the best bacteriological methods available for the identification of specific etiological agents.

EPIDEMIOLOGICAL OBSERVATIONS

As illustrative of the methods employed and certain of the interesting observations in the epidemiological study of the acute diarrheal diseases, I am reporting a portion of a not yet completed study in a small village in New Mexico. Findings are somewhat unusual in the richness of the positive observations but conform in type to those in 3 other areas similarly studied.

Chilili is a relatively isolated Spanish speaking community with a summer population of 210 persons. The public health nurse visits the area once weekly. On August 20 she reported that she had found a baby aged 24 days very sick with acute diarrhea, and that 2 other infants were having milder symptoms, which had then persisted for almost a week. The inquiry had also revealed the recent occurrence of mild diarrhea involving adults in 2 different families. Platings from a diaper brought to the laboratory revealed that the young infant had a *S. dysenteriae* infection. Hospitalization was refused, the course was rapidly downward, and the child died 3 days after first seen.

Inquiry in the 5 families from which cases of acute diarrhea had been reported revealed no common exposures or close relationships. However, a clear record of a communicable disease was given in the family with the fatal case of proven bacillary dysentery. A visiting grandmother had come from the home of a son where 2 adults had recently been troubled with diarrhea. She herself had a mild diarrhea on arrival. Within 10 days 4 of 5 adults and 2 (1 the fatal case) of 3 children had acquired the same disorder. The mother of the young infant was ill for 4 days and in bed for 2; the other adults and a child of 4 years made no complaint beyond the second day.

The people of this area had attained the reputation of being particularly coöperative with the Health Department. A detailed study seemed both promising and warranted. In undertaking this, the object was to collect complete records concerning the occurrence of diarrheal disorders, to obtain stool specimens from all or almost all of the people, and to make a house-to-house sanitary survey of the area. The stool specimens were willingly provided by a large majority of the people. Four families with histories of diarrhea (in 2 instances with proven cases of bacillary dysentery) found it too inconvenient to comply with our request, as did 6 others in which the people had been continuously well. In all, laboratory specimens were obtained from 155 individuals. Three of these were active clinical cases—all proved to be positive for *S. dysenteriae*. Of those who were well at the time of the

* Subsequent serological study of our isolated organisms revealed a substantial number of strains antigenically identical with Clayton and Warren's "Newcastle dysentery bacillus."

examination, 18 (11.6 per cent) yielded the same organism. Including the 3 cases, 20 of the 21 positives were within a delimited area which included about one-half of the residents of the village. These findings are to be compared with the more normal population groups, in which the carriers of *S. dysenteriae* are quite rare. Studies here are unfortunately too meager or uncertain to permit the statement of any numerical proportions.

It is apparent that in this village *S. dysenteriae* had infected a great many—substantially more than these positives which were found as a result of one test only. A further striking feature is that there existed the widest variation in the reaction by different individuals to the parasitic organisms. Adults were either undisturbed or had a mild diarrhea while some children were overcome with a severe, and in 2 instances fatal infection. Observation of severe cases alone would have produced no useful epidemiological evidence; observation of all cases, including the mild transient disorders, would have given a very incomplete picture; but a study of the whole population group did give an epidemiological picture which clearly indicated significant variations in incidence.

In formulating the epidemiological approach to the diarrheal disorders, the varying and usually mild pathogenicity of many of the etiological agents must be appreciated. We have to deal with a group of organisms near the borderline which separates the parasitic and saprophytic agents. Often they may and do assume the rôle of the latter, or at most they may be but mildly pathogenic. Occasionally in susceptible individuals their parasitic properties become fully evident. It is not the latter which we must seek to examine, but rather the spread and history of the organisms in all their relationships.

PREVENTION

A very simple experimental examination of preventive measures is now under way as a part of our studies in New Mexico. For this test a semi-rural area with a population of approximately 1,000 was selected, in which the incidence of acute diarrhea has been consistently high in recent summers. A representative sample of the inhabitants was also examined in 1936 and a relatively high incidence of carriers of *S. dysenteriae* was found. During the winter at public expense the universally insanitary privies were replaced by sanitary ones. Save for the incidental education concerning the maintenance and use of these, no other changes were made. It is safe only to comment that during the summer of 1937 the total incidence of diarrheal diseases was very low and that the carriers of *S. dysenteriae* had declined in number, though still numerous enough to permit ready spread of the specific infection in a favorable environment. Despite the optimism of families concerned and the physicians serving the area, judgment must be reserved. It is noteworthy, however, that no such decline has taken place in areas in which only a portion of the population had been provided with effective sanitary arrangements. Complete sanitation appears to provide effective protection while partial sanitation evidently has little value.

The incidence of typhoid fever has heretofore served as an index of the adequacy of sanitation. It is suggested that in the diarrheal disorders we have a more sensitive measure and the one which may well be commonly employed in the future.

SUMMARY

The prevention of mortality and morbidity from the acute diarrheal diseases remains an important public health problem.

Clinically these disorders may be classified with reasonable accuracy as non-infectious and infectious. The former are usually acute and of very short duration, or mild and quite chronic. The latter vary widely in manifestation. Clinical characteristics do not serve to separate reliably the Shigella infections from other infectious conditions.

Cultural studies are essential for reliable diagnosis. Success in this varies widely, depending in large measure on the differential media employed. Attention is called to the value of the desoxycholate citrate agar.

In epidemiological studies designed to determine the incidence or spread of these infections, it is essential that healthy individuals and those mildly ill be examined with the same interest and care as those severely ill.

The major problem in the prevention of the acute diarrheal disorders appears to be the more effective prevention of the dissemination of human excrement.

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Carbolized Vaccine for Animal Bites

FOR bitten people treated by one or the other of two methods (carbolized vaccine or Pasteur's method) in 1933, with 100 as the standard, in 1934 there were 93.30 and for 1935 there were 81.10. For patients treated who were bitten by animals known to be rabid in 1933, with 100 as standard, there were 79.80 in 1934 and only 57.20 in 1935.

For the whole period of 3 years, among 5,918 patients treated, of whom 787 (13.20 per 100) were bitten by animals known to be rabid, there were only 5 failures, 0.08 per 100.

The study of several types of antirabic vaccine have led to the conclusion that the carbolized vaccine has an indisputable superiority on account of the ease of preparation and of use, and also on account of the ease of transportation and its keeping qualities. It is the most economical and rarely causes local reactions in the persons treated.—Prof. Petragnani, Protection Contra La Rage en Italie, *Office International D'Hygiene Publique*, Mar., 1938, p. 168.

A Water-Borne Outbreak of Gastroenteritis in a Tennessee Town*

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LATE in the summer of 1936, it came to the attention of the State Health Department that an East Tennessee town of approximately 2,500 inhabitants was experiencing a moderately extensive epidemic of gastrointestinal disorder and that similar outbreaks of variable severity had been experienced at irregular intervals for several years. The annoyance of repeated outbreaks had finally created sufficient public interest and concern to cause a request for an investigation. The extent and severity of previous outbreaks are unknown since epidemiological and morbidity data for previous years were not reliable.

Unfortunately, neither of the rather well defined outbreaks occurring in June and August, 1936, was reported until after each had practically subsided. The epidemiological approach was not unlike the usual procedure in an investigation of this type. The data included in this report were procured as a result of a house-to-house survey which was made of the entire town immediately after the last outbreak in August. Epidemiological, engineering, and laboratory personnel coöperated in this coördinated study.

The town has municipally owned and operated water and sewerage systems, which serve approximately 95 and 82 per cent, respectively, of the population. General economic, social, and public health conditions were considered fairly typical for a town of this size.

SURVEY FINDINGS

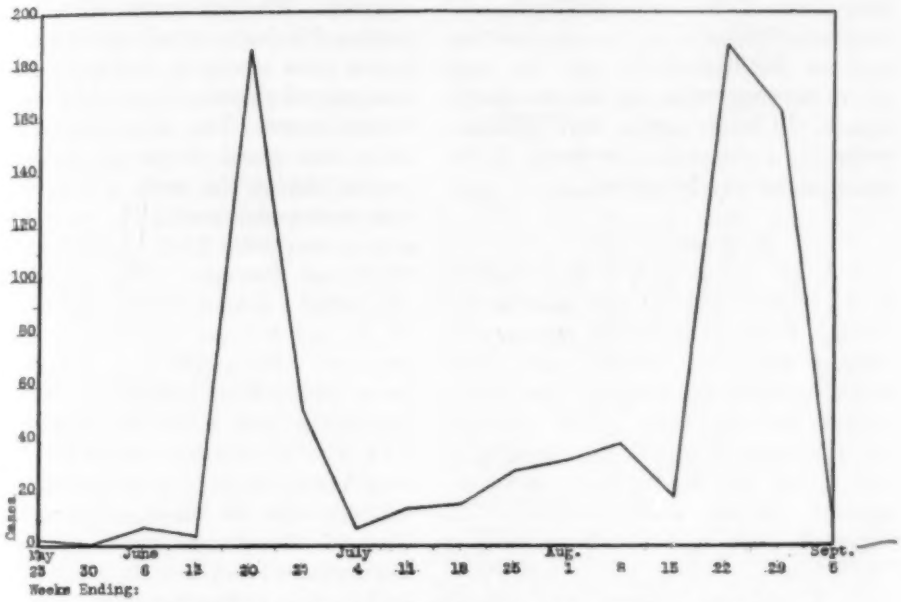
A. *Epidemiological*

A total of 765 persons, or approximately 31 per cent of the town's population, was found to have had one or more rather well defined attacks of gastroenteritis from May 16 to September 2, 1936. A small number of cases was excluded from the final summary because of the vagueness of symptoms or lack of information suitable for statistical analysis. The morbidity rate for a nearby town was found by actual survey to be 24 cases per 1,000 population as compared to a rate of 312 in the epidemic area. Only 17 clinical cases were found during the house-to-house survey. Efforts to isolate the probable causative organism from these cases were not successful.

More than 90 per cent of the cases gave a history of sudden onset with nausea, vomiting, and epigastric discomfort of variable degree and duration, usually lasting from 2 to 10 hours. The majority of cases gave a

* Read at a Joint Session of the Public Health Engineering and Epidemiology Sections of the American Public Health Association at the Sixty-sixth Annual Meeting in New York, N. Y., October 8, 1937.

CHART I



CASES OF GASTRO ENTERITIS IN A TENNESSEE TOWN, MAY 16 - SEPTEMBER 2, 1936

history of diarrhea, abdominal pain, distension and mild tenesmus within 4 to 10 hours after onset. These symptoms persisted from 2 to 6 days, depending largely upon the time treatment was begun. Some of the untreated cases reported the passage of small amounts of blood and mucus. Approximately 50 per cent gave a history of a slight elevation of temperature. Weakness was found to be directly proportionate to the severity of the symptoms. There were no reliable data indicating the formation of any degree of immunity against the offending agent, although there were some indications that the first attack was usually more severe than subsequent ones.

The case distribution was uniform throughout the urban and suburban areas receiving city water. Chart I shows the time distribution as determined by the survey. It is of more than passing interest that the peaks of the 3 major outbreaks occurred on Saturdays. We can only surmise the probable explanation of this phenomenon. Although the survey was discontinued early in September it was later learned that of the 179 students in a local private school served by this municipal system, 62 typical cases occurred during the weeks and week-ends of September 5, 12, 19, and October 17. It was later learned that similar fall and spring outbreaks had occurred in this institution during preceding years with annoying consistency.

All cases were uniformly distributed by age, sex, color and occupation. Careful inquiry failed to incriminate a possible source of infection such as foods, milk, ice, community gatherings, visits out of town, sanitation, etc. The only vehicle common to the majority of cases was city water—actually 89.2 per cent of the cases were found to have used the city water supply almost exclusively, with an additional 8 per cent having used city water most of the time. The uniform distribution of

cases throughout the city, the explosiveness of the major outbreaks, the relative mildness of the attacks, and the uniform distribution by age, sex, and color, together with the known condition of the water supply were sufficient to justify a comprehensive study of the entire water supply system.

B. *Engineering*

A large spring with a dry weather flow of about 450 gal. per minute and coming from a limestone region containing numerous caverns and sinkholes provided an adequate raw water supply for the town. The concrete storage basin of 50,000 gal. capacity at the spring was inadequately protected against surface contamination. An elevated tank and standpipe holding 75,000 and 325,000 gal., respectively, floated on the system to provide storage and equalize pressure. Chlorine was applied to the pump suction and the water pumped immediately to the distribution system without further treatment.

The State Health Department engineers have since 1931 recognized certain potential dangers of contamination from 4 known cross-connections. Repeated but unsuccessful recommendations have been made for their elimination. The operation records of the system submitted to the State Health Department have been excellent. These records together with routine engineering investigations indicated that the supply was reasonably safe. Daily tests indicated a chlorine residual of 0.2 to 0.4 p.p.m. throughout the preceding 2 years. Daily turbidity tests covering 6 weeks early in 1936 showed excessive turbidity following rains. These readings varied from 5 or less to as high as 340 following a heavy rain on the watershed, but apparently bore no significant relationship to the epidemics. Further studies revealed an actual chlorine residual of only 0.1 p.p.m. instead of the 0.2–0.4 p.p.m. previously reported. The operator's error in reporting chlorine residuals was due to defective color standards and a previously unsuspected chlorine demand of the untreated water. The water level in the tanks was found to be gradually decreased during the week and built up over week-ends, causing the pump pressure to vary from 75 lb. on Mondays to 70 lb. on Fridays. The pump discharged at a rate of 260 gal. per min. at 75 lb. and 310 gal. per min. at 70 lb. pressure. The chlorinator setting was never changed to compensate for this fluctuation, and a chlorine residual of 0.1 p.p.m. on Mondays would have been even less on Fridays, perhaps below the safety margin for adequate disinfection. The chlorine dosage was increased on September 15 to maintain a residual of 0.25 p.p.m. Despite this, epidemic cases continued to occur as late as October 25. More complete investigations indicated that cross-connections probably were not contributing to the local problem.

C. *Laboratory*

Monthly bacteriological examinations had at no time in the past 2 years given any indication of contamination. At the time the study was begun, 6 stations, 5 on the distribution system and 1 at the untreated source, were selected for the collection of daily samples. Samples for bacteriological and chlorine residual determinations were taken from September 14 through December 14. During this period only 2 samples of the treated water, one on September 24 and one on November 13, showed contamination, and of these only 1 of the 5 10 c.c. portions showed the presence of organisms of the coli-aerogenes group. Two samples, both collected on September 14, showed a chlorine residual of 0.0. The average for all stations during the period was about 0.2 p.p.m. None of the treated samples

taken for bacteriological analysis was dechlorinated before shipment and approximately 18 hours elapsed between collection and arrival at the state laboratory. The untreated samples showed a widely fluctuating coli-aerogenes contamination, varying from an occasional zero to more than 24,000 organisms per 100 c.c. on numerous occasions. The highest recorded finding was 240,000. There was no evidence to indicate that the outbreaks were of chemical origin.

D. *Miscellaneous*

A terra-cotta sewer outfall serving about 75 homes, with an estimated average discharge of 6 gal. per min., passed within 60 ft. of the spring (Chart II). On November 10, it was noted that there was no discharge of sewage at the sewer outlet. A check of manholes revealed a steady flow at No. 5 but only an intermittent flow at No. 4. Excavation of the sewer outfall between these two points was started immediately, and on November 14 a leak was found about 40 ft. higher than the spring and 200 ft. away. Sewage was flowing through an improperly sealed joint and into a cavern which appeared to lead toward the spring. This leak was stopped immediately. The terra-cotta outfall was later replaced with cast-iron pipe. A storm drain was also found to be emptying into the sewer and apparently was the principal cause of the turbidity previously referred to.

The improvement in bacterial quality of the untreated spring water following this correction is shown in Table I. The reduction in turbidity has been equally noticeable since the sewer was repaired, with only 6 readings exceeding 10 and none exceeding 25.

A connection between the point at which the sewer leaked and the spring was proved by the use of a salt solution. One hundred lb. of salt were dissolved in 50 gal. of water and drained into the cavern together with a stream of water at the rate of 6 gal. per min. for 8 hours. The solution was detected in the spring water 10 hours after the experiment was started and persisted for 20 hours or longer. The solution could not be detected at the end of 40 hours. Table II shows the results of these tests.

TABLE I

Estimated Number of Coli-Aerogenes Organisms per 100 c.c. in Water of a Tennessee Town—1936–1937

Before Leak in Sewer Repaired		*After Leak in Sewer Repaired*	
Date	*Estimated No. Organisms*	*Date*	*Estimated No. Organisms*
11/ 4/36	0	11/15/36	0.0
11/ 5/36	2,300	11/16/36	230.0
11/ 6/36	2,300	11/17/36	2.2
11/ 7/36	0	11/18/36	2.2
11/ 8/36	0	11/19/36	8.8
11/ 9/36	2,300	11/20/36	0.0
11/10/36	940	11/21/36	5.0
11/11/36	0	11/22/36	0.0
11/12/36	240,000+	11/23/36	5.0
11/13/36	0	11/24/36–	
11/14/36 *	900	12/14/36 Daily	0.0

* Leak in sewer repaired

CHART II

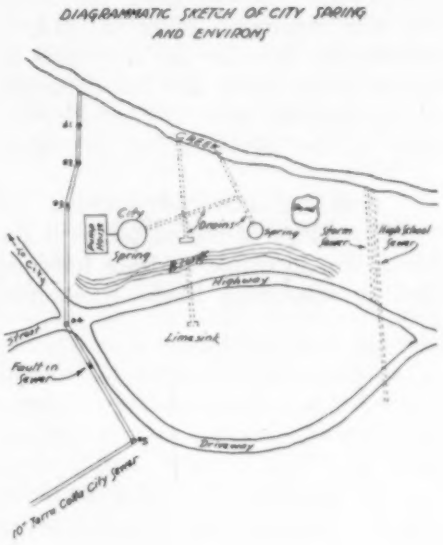


TABLE II

Records of Chloride Determinations in Water of a Tennessee Town—1936

Date	*Time*	*Chlorides Parts per Million*
11/24/36	7:15 A.M.	0.0
	9:00 A.M.	NaCl applied to leak in sewer
	12:00 Noon	0.0
	6:00 P.M.	0.0
	7:00 P.M.	1.0
	9:00 P.M.	2.0
11/25/36	1:00 A.M.	3.0
	9:40 A.M.	6.0
	10:55 A.M.	7.0
	2:00 P.M.	6.5
11/26/36	11:30 A.M.	0.0
11/27/36 to 12/ 9/36	Daily	0.0

ACCOMPLISHMENTS

A large portion of the terra-cotta sewer outfall has been replaced with cast-iron. The quality of the raw water showed a marked improvement after the sewer defect was corrected. The most dangerous cross-connections, although not implicated in the outbreaks, have been eliminated. Subsequent investigations have revealed that outbreaks of gastrointestinal disorders among those using city water have been conspicuously absent since the sewer line was repaired. It is particularly noteworthy that for the first time in several years spring and fall outbreaks of the disorder have not been experienced in the private school mentioned.

SUMMARY AND CONCLUSIONS

The etiology of the outbreaks is unknown but available evidence indicates that it was most likely transmitted through the public water supply. Knowledge of possible conditions contributing to the contamination of this particular supply would lead one to suspect that one or more factors may have contributed to the outbreaks. Among them are:

1. Bacteria of the colon-typhoid-dysentery groups in the supply as a result of excessive raw water contamination and an inadequate purification process.

2. Bacteria not found by ordinary methods of water analysis. Samples were not dechlorinated at the time of collection, hence may have become sterilized during the period of transportation.

3. Bacteria not suspected, due perhaps to destruction of indicator organisms before reaching the laboratory.

4. Toxic products created as a result of septic action in the sewage that reached the raw water supply. Based on the probable concentration of such products in the supply, this possibility is considered rather remote. However, the fact that all cases recovered rapidly and without sequelae together with the absence of typhoid and paratyphoid cases in the population group over a period of years gives some support to this theory.

The study suggests: (1) The need of more exhaustive studies in this particular field, particularly as to determination of the causative organism. (2) That the epidemiologist, engineer, bacteriologist and public health administrator have specific responsibilities in coördinated studies. (3) That field laboratory equipment should be made available for studies of this type in event satisfactory laboratory facilities are not readily accessible. (4) That the more common factors contributing to these outbreaks should be eliminated before we seek the indefinite if not hypothetical cause.

Gastrointestinal Disorder Not Proved To Be Water-Borne*

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REPORTS of epidemics of intestinal disturbances are quite common. In many instances the causative organism is readily found and the vehicle of transmission is apparent. Other more puzzling outbreaks occur in which presumptive evidence alone is obtained.

It is desired to report an epidemic of the latter type, which is of interest largely on account of the extensive studies that were made and the procedures followed.

Situated on the Chattahoochie River, which separates Alabama and Georgia, are the twin towns of West Point, Ga., and Lanett, Ala., and extending in almost continuous form from Lanett, Ala., are the various mill villages of the West Point Manufacturing Company—namely, Shawmut, Fairfax, Langdale, and Riverview. Reports as to the occurrence of cases of persistent diarrhea in this population of some 25,000 people were made during the latter part of 1935 to both the Georgia and Alabama Health Departments. The first supposition was that the disease was amebic dysentery and many of the cases were reported as such. Early in 1936 the Health Officer of Chambers County, Ala., reported the disease to be on the increase and this led to an investigation.

LABORATORY PROCEDURES

As a preliminary step it was decided that fresh specimens should be examined from a number of these patients to confirm the tentative diagnosis of amebic dysentery. Owing to the distance from any established laboratory in the state system, a field laboratory was set up and a clinic held on February 12 and 13, 1936. Sufficient equipment was taken to make warm stool examinations and cultural studies for bacillary dysentery, and any pathogenic fungi which might be present. Differential blood counts were run and occult blood determinations were made on all specimens. Careful case histories were obtained from all patients.

Warm stools were examined microscopically for intestinal parasites. Fresh feces were plated on Endo's medium for bacillary dysentery and portions were inoculated into lithium chloride glycerine and streaked on 5 successive days on Endo plates for organisms of the typhoid-paratyphoid group. Liver infusion agar with rice starch and serum was employed for the determination of amebic cysts. Plates

* Read at a Joint Session of the Public Health Engineering and Epidemiology Sections of the American Public Health Association at the Sixty-sixth Annual Meeting in New York, N. Y., October 8, 1937.

of Sabouraud's maltose agar were streaked for the presence of pathogenic fungi.

During the 2 days, 25 patients and 14 milk handlers were examined. It was soon apparent that *Endameba histolytica* was not present. Cultural results for bacillary dysentery, organisms of the typhoid-paratyphoid group, and fungi were negative. The only finding of note was the presence of an unidentified flagellate in 5 of the 25 patients and in 1 of the 14 dairymen. The differential counts were normal but occult blood was present in a large number of fecal specimens.

Since the flagellate was the only lead it was decided to repeat the clinic and concentrate all efforts on the isolation and identification of this organism. Accordingly, on February 25 and 26, 28 patients, some of whom were the same as in the first clinic, were examined. Direct smears were studied and cultures made on Loeffler's serum saline. Also, smears were stained from iron hematoxylin.

The cultures were brought back to Montgomery where they received intensive study. The organism was definitely identified as *Trichomonas hominis*. Forty-two patients were examined during the 2 visits to Lanett. Of these, 11 showed the presence of *Trichomonas hominis*. Thirteen patients were examined at both sessions, 1 showed the presence of this organism both times, and 1 negative the first time was positive during the second examination. Although our sample of 2 cases is quite small, this does show that there is some intermittency in the discharge of this organism.

On March 6, the Georgia State Department of Health conducted a clinic in West Point. The stools of 13 patients were examined and blood counts made on each. Eosin-methylene-blue plates were streaked on successive days for the presence of members of the typhoid-paratyphoid-dysentery group; blood agar slants were inoculated for streptococci; Sabouraud's medium was used for the detection of pathogenic fungi, and differential counts were performed. Their findings were as equally indefinite as ours in the first 2 clinics.

Because the pathogenicity of *Trichomonas hominis* is disputed, and this was the only organism found which might be a causative factor, it was decided in a conference with representatives from both the Alabama and Georgia State Departments of Health that consultant assistance was essential. Accordingly, Dr. Justin Andrews, of the Johns Hopkins University, and Dr. A. V. Hardy, of the U. S. Public Health Service, were invited to assist in the next investigation. A clinic was arranged in Lanett March 24 to 26, at which time 95 patients from Alabama and 32 from Georgia were examined. Thirty-five of these were reëxamined to confirm their original findings. Fourteen normal individuals were submitted as controls.

The same general methods were employed, with the Alabama technicians doing the direct examinations, and the Georgia technicians being responsible for the bacteriological procedures. Dr. Andrews personally checked all specimens for protozoal content.

The specimens were collected in cardboard ice cream boxes without any preservative, some at the improvised laboratory and others by the nurses in the homes. Because of the promptness with which the cultures were made it was not considered necessary to use a preservative. Most of the specimens were still warm when cultured. All specimens were first subjected to examinations for protozoa and then cultured, the cultures being made on Endo and eosin-methylene-blue plates. At least one plate of each medium was used. Colonies were picked after 24

and 48 hours' incubation. The specimens were not replated, because primary interest was in demonstrating members of the *B. dysentery* group and it was decided that it would not be worth while to keep the specimens after the original plating.

Of the 127 patients examined, only 5 showed the presence of *Trichomonas hominis* and of the 32 who were re-examined, only in 3 was this organism demonstrated. In the normal control group *Trichomonas hominis* was not present. The intensive bacteriological study did not reveal any members of the typhoid-paratyphoid-dysentery group.

The findings from all 4 clinics were inconclusive. Amebic and bacillary dysentery were ruled out. No members of the typhoid or paratyphoid groups and no fungi were demonstrated. *Trichomonas hominis* was found at one of the early clinics, but final results did not incriminate this organism.

EPIDEMIOLOGICAL STUDIES

The symptomatology was that of diarrhea of acute onset, varying from 5 to 25 stools per day unaccompanied by any pain or tenesmus. There was no dehydration or emaciation, although weakness was usual. The feces showed no visible blood, but evident mucus. The severity of the disease varied, but once acquired it persisted over months.

The cases occurred on both sides of the river and in all the mill villages, although the largest number were present in Lanett which merges with West Point, Ga. Several hundred cases probably occurred, but 95 cases were carefully studied on the Alabama side, with an additional 32 from West Point, Ga. The date of onset varied from January, 1935, to the time of investigation in February and March, 1936; but the majority had their beginning after December 1, 1935. Some of the cases seen were, therefore, of more than a year's duration, while others were of only a few days.

The disease was confined to the white population, but otherwise showed no predilection for any age, sex, or occupation. No evidence could be elicited that contact, travel, banquets, shellfish, common food supplies, patent medicines, fruits or vegetables, played a part. The milk supply for the area came from a number of dairies. The percentage distribution of cases was approximately in proportion to the size of the dairy and no evidence could be found to incriminate milk.

WATER SUPPLIES

The widespread distribution of cases naturally suggested water as the common source.

Lanett and Shawmut are supplied by the same distributing system, taking raw water from the Chattahoochie River and processing it by chemical coagulation, settling, filtration, and chlorination. Fairfax and Riverview have a separate system, but use the same methods. In addition, there is an industrial water supply to the bleachery at Lanett which is not chlorinated, but which has no connection with the regular system.

West Point obtains its supply from a creek on the west side of the Chattahoochie River and north of the city. The water is treated similarly to the Lanett supply and then collected in a brick reservoir which is flooded when the river stage reaches 23 feet, but this was not reached at any time during 1935 or 1936. There are connections between the West Point and Lanett systems so that water can be exchanged if necessary. In practice the exchange has been from Lanett to West Point and on several occasions during the time of the epidemic Lanett water was used in West Point.

Bacteriologic examination of all water supplies was carried out regularly and

at no time was there any evidence of an unsatisfactory finished product.

Follow-up of the Alabama cases revealed that the condition gradually improved and that no new cases occurred during the winter of 1936–1937.

SUMMARY

An epidemic of gastrointestinal disorder occurring in several adjoining towns is reported.

The procedures followed in attempting to establish the etiological agent are described.

The failure to incriminate any organism made epidemiological studies difficult, and no source could be found.

DISCUSSION

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I APPRECIATE very much the opportunity of discussing this paper, particularly, since we on the Georgia side had the privilege of collaborating with the Alabama group in this study.

Dr. Gill has forcibly brought out the following facts:

1. The absence of any bacterial agents that could account for the outbreak.
2. The absence of any protozoal organism that could be responsible for the outbreak. At this point I should like to state that an *E. histolytica* carrier was found among the controls.
3. Only white people were affected.
4. Age, sex, and occupation apparently were not factors.
5. The cases obtained their milk from a number of dairies and the percentage distribution was approximately in proportion to the size of the dairy.
6. There was no evidence that contact, travel, banquets, shellfish, common food supplies, patent medicine, fruits or vegetables played any part.

I feel that the above facts, by a process of elimination, point to the water supply. It is a matter of common knowledge that at the time there existed a "bottle neck," so to speak, in the river less than a mile below West Point. It is also a matter of record that when the river stage at West Point reached 20 ft., the stage below the "bottle neck" was only 12 ft. As pointed out, the West Point water supply was obtained from a creek just before it emptied into the river. However, the river had to rise less than 2 ft. above the normal stage of 3.5 ft. before river water was being used for the West Point supply. The West Point intake was ¼ mile above the business district. In the business district of West Point 3 trunk sewer lines emptied into the river. The water intake of Lanett was situated at several hundred yards below West Point.

In connection with the West Point Manufacturing Company, situated at Lanett, there was a dye and bleachery works, the effluent from which was discharged at intervals into the trunk sewer line of Lanett at a point not distant from its outlet. The Lanett sewer outlet was situated several hundred yards below the Lanett water intake.

The idea which I am suggesting is that this condition may have come about as the result of a chemical discharged intermittently into the river and at times taken into the water supply of both Lanett and West Point due to the pooling action which the river must have had as a result of its narrowing at a point below the sewer outlet of Lanett. The points in support of this hypothesis are:

1. No known etiological agent could be incriminated.

2. The lack of secondary familial cases.
3. The chronicity of the disease and the absence of fever.
4. The outbreak resembled a water-borne one, except that it was not explosive.
5. The respective numbers of cases in the two towns were in proportion to the respective distances of their water intakes from the Lanett sewer outlet.
6. No cases were found among negroes, who for the most part obtained their water from wells.
7. All ages and both sexes were apparently equally affected.
8. Since the elimination of the "bottle neck" in the river no new cases have developed.

College Survey of Health

THE preliminary report of a survey of health of college students was presented to the American Youth Commission of the American Council on Education at its meeting May 10, at the Chamber of Commerce of the United States. The survey, conducted by Harold Diehl, M.D., dean of medical sciences, University of Minnesota, and Charles E. Shepard, M.D., director, Men Students' Health Service, Stanford University, covered 551 colleges and universities throughout the country.

Two general classes of health problems affect college students, the report states: those from deficient care and education in earlier years, and those associated with the college environment itself. To discover earlier deficiencies, each student, upon entering, should be given a thorough medical examination, to be followed by periodic examinations during succeeding years.

The value of a complete health examination at the time of entering college is shown by the fact that in 56 institutions where tests for tuberculosis are given as a matter of routine to all new students, approximately one-third (34.5 per cent) were shown to be infected, though only to a slight degree, with the disease.

The complete college health program, the study points out, should consist of 4 basic factors: a student health service for individuals, a campus public health service for the student body, classroom instruction in health matters, and physical education as a health activity and for correction of deficiencies. The success of any college health program depends upon the integrated development of these four principles, even though the extent may vary according to size, purpose, and resources of the individual college, it points out. In general, financing should be by means of term or annual assessments paid by the students, supplemented when necessary by funds of the institution.

Pathological and Immunological Studies in Poliomyelitis

And Their Significance in Therapy and Treatment*

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A CONSIDERABLE amount of work has been carried on in the past few years in poliomyelitis toward the elucidation of the portal of entry and route of transmission of the virus and upon the significance of the so-called antibody or neutralizing substance. These studies have not only increased our understanding of the disease, but open to doubt previous concepts of treatment and prevention and open up new avenues for studying these.

In order to clarify and evaluate the experimental data herewith described, a few remarks about experimental poliomyelitis are needed to indicate the methods used. The disease agent, a filterable virus, cannot grow upon non-living media as do bacteria. It has a narrow range of host susceptibility, the central nervous system of man and certain monkeys, where it multiplies and produces lesions. The experimental animal of choice is the *Macacus rhesus* monkey. The spread or multiplication of the virus can be demonstrated by inoculation into the monkey, whereupon the animal develops fever, cerebrospinal fluid pleocytosis, and flaccid paralysis. The histo-pathological picture of the cord and brain stem shows neuronoplagia, with perivascular and interstitial infiltration. The spinal cord of such an animal can, upon suitable inoculation, produce the disease in another animal.

The neutralizing substances or so-called antibody is present in the blood serum of certain normal individuals, especially adults, and also in the serum of some convalescent humans and monkeys. A serum which contains neutralizing substance renders virus non-infective, so that the incubated mixture fails to infect monkeys.

The virus used in this and many other laboratories has been passed through monkeys for many years and is highly virulent for these animals. From time to time new strains obtained from spinal cords or nasal secretions are transferred to monkeys. It is essential to know whether such strains are related to or differ immunologically from, the standard virus. This is done by testing with the new strains sera known to have neutralizing bodies for the passage virus and animals that have recovered from it. Likewise, animals recovered from the new virus and their sera are tested against the passage strain.

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* Read before the Laboratory Section of the American Public Health Association at the Sixty-sixth Annual Meeting in New York, N. Y., October 6, 1937.

THE PATHOGENESIS OF THE DISEASE IN THE MACACUS RHESUS MONKEY

The essential lesions of experimental poliomyelitis occur in the cord and brain stem and closely resemble the human findings. There has been considerable controversy regarding the route of transmission and the pathogenesis has only been established in the past few years.

Despite the systemic symptoms which may occur prior to central nervous system symptoms, one can readily rule out a primary hematogenous or lymphogenous spread. The virus has rarely been isolated from the blood or tissues other than the central nervous system.[1] In our laboratory we tested the blood of intranasally infected monkeys in the incubation period in the pre-paralytic, and late stages of the disease, and were unable to demonstrate virus.[2] Likewise, animals sacrificed in the pre-paralytic stage failed to show the presence of virus in the liver, spleen, lymph glands, kidneys, salivary glands or muscles.[2] Likewise, in keeping with the findings of others, we failed to show significant lesions outside the central nervous system in more than 50 monkeys killed in the acute stage of the disease.

The transmission of the virus through the central nervous system is not by way of the spinal fluid for it is rarely found there. We were unable to demonstrate the presence of the virus in spinal fluid removed in the incubation period, in the pre-paralytic or paralytic stages of intranasally infected monkeys.[2] The work of several investigators has indicated that the cellular exudate in the cerebrospinal fluid is the result of an overflow from the nervous tissue by way of the perivascular spaces. In keeping with this is the fact that symptoms may occur in the animal prior to pleocytosis or may even be absent, throughout the course of the disease.[3]

The idea of transmission by nerve tracts, first suggested by Liener and Wiesner and Römer, has received considerable support by Hurst and coworkers in England and Faber and ourselves in this country. Fairbrother and Hurst [4] traced the virus from such sites of inoculation as the brain and sciatic nerve by following the sequence of the histo-pathological changes and distribution of the virus at various stages of the disease, and concluded that it travelled by way of the nerve tracts. After intranasal instillation of virus, lesions and virus are first found in the olfactory bulbs,[5] and follow in a general way the olfactory apparatus.[4, 6] We [7a] as well as Schultze and Gebhardt [7b] have been able to prevent infection via the nasal route by sectioning the olfactory nerves. Likewise, we were unable to infect a monkey by inoculating below the line of cleavage of a sciatic nerve whose perineural sheath had been sutured. In keeping with these findings Jungleblut and Spring [8] reported that after intracerebral inoculation into an animal with severed spinal cord, the virus failed to reach the lower segment. We have found that in animals with cut spinal cords and in which a free flow of cerebrospinal fluid was demonstrated, the virus failed to pass the gap when inoculated into either the upper or lower segment. Similar findings were obtained with both passage virus and two recently isolated strains. These experiments also help to rule out either hematogenous or lymphogenous spread of the virus for the blood supply was intact to both upper and lower segments of the cerebrospinal axis.

If the virus travels along nerve tracts one would expect its primary effects upon the neurones. This is borne out by the histo-pathological studies and by the fact that the amount of nerve cell destruction in the various areas of the cerebrospinal axis correlates with the quantity of virus present. It appears,

therefore, that in experimental poliomyelitis injury and death of nerve cells is the outstanding lesion, and that the exudate is merely secondary.

One cannot always interpret the human disease in the light of the results obtained in experimental animals. In yellow fever, for example, the virus produces a generalized disease in humans and in monkeys, while in the mouse the disease is decidedly neurotropic. The manifestations of some other viruses also vary with the host.

The portal of entry in the human has been and still is the subject of considerable controversy. In the experimental animal the virus has a definite predisposition for the olfactory nerve, but we shall consider only those studies, which deal directly with the human.

Evidence to favor the nasopharynx as the portal of entry has been: (1) The epidemiology of the disease resembles in many respects a droplet disease. (2) The onset of the disease is often accompanied by upper respiratory symptoms. (3) The virus has been isolated from the mucosa and nasopharyngeal washings of acute cases, from the nasal excretions of normal and convalescent carriers, abortive and non-paralyzed cases. (4) Rarely has the virus been isolated from the gastrointestinal contents or its mucosa.

The gastrointestinal tract as a portal of entry has received considerable attention recently by Kling and coworkers in Europe and Toomey in this country. They have pointed out certain epidemiological aspects of the disease whereby it resembles a gastrointestinal infection and have also stressed the gastrointestinal symptoms that often accompany the onset. Important are the findings of Harmon [9] who failed to find the virus in the nasopharyngeal washings of 20 cases but who found it in the gastrointestinal contents of 5 of these cases. Equally significant was the failure to find lesions in the olfactory bulbs of 9 acute cases, a finding in keeping with that of Smith,[10] who found lesions in only 25 per cent of 56 cases.

These conflicting data in the epidemiology and in the isolation of virus from the human body, should make one consider both portals of entry, especially as some epidemics start with nasal and others with gastrointestinal symptoms.

Direct evidence upon the route of transmission, based upon studies in the human is rather meager. The idea of a general dissemination either lymphogenous or hematogenous has received considerable support, especially from clinicians, based on the systemic manifestations of the disease frequently present prior to central nervous system symptoms. Medin stressed the preparalytic symptoms and described the so-called dromedary or diphasic type of the disease. Many pathologists have stressed the histo-pathological lesions found outside of the central nervous system. Rissler was one of the first and recently Smith [10] has stressed their importance.

On the other hand, there are those who believe that the generalized symptoms can be explained entirely upon a central origin. The virus in travelling through the central nervous system can strike the temperature and vasomotor centers in the hypothalamus giving fever, gastrointestinal or upper respiratory symptoms, and other symptoms evident in early poliomyelitis. If in monkeys where the disease is entirely neurotropic one can have a systemic phase of the disease and even diphasic attacks,[3] the same should be possible in the human.

Likewise, some believe that the lesions outside of the central nervous system are inconsequential, like those of any acute infectious disease. They may not indicate a proliferation of the virus

in these organs. Our own studies of 7 cases were in accord with this belief for we found but slight changes in the spleen, lymph glands, and thymus.

Attempts to obtain the virus from the blood stream have been negative. Likewise, the virus has been isolated from organs other than the central nervous system but once,[1] although the number of attempts have been relatively few. In our laboratory different tissues, including the liver, spleen, kidney, lungs, submaxillary glands, mesenteric lymph nodes and muscle from 3 cases were tested for the presence of virus. Large quantities of these tissues failed to produce poliomyelitis in monkeys, although infections were obtained with relatively small amounts of cord tissue from these cases.

It is hardly likely that the virus is carried by the cerebrospinal fluid, for our attempts and those of others have failed to reveal the presence of virus in it. Moreover, the pleocytosis may occur after the onset of nervous symptoms, or be absent, suggesting that the cells enter the sub-arachnoid space from the cord. The increase in protein sometimes occurs after the pleocytosis, hardly likely if the meninges were involved earlier than the cord. Therefore, axonal transmission and primary involvement of the neurones, the latter suggested by Charcot and Jeffrey 65 years ago, must be considered, but is in need of further proof.

The presence of neutralizing bodies and resistance to the disease are not necessarily correlated:

IMMUNOLOGICAL STUDIES

When the virus of poliomyelitis is inoculated into a susceptible host, 2 changes can occur: one a resistance to reinoculation, the other the development of the so-called neutralizing substances. It was thought until recently that these correlated.

As has been recently pointed out by Schultz and Gebhardt [11a] and Olitsky and Cox,[11b] we have found that animals inoculated by the skin route with active or modified virus may develop neutralizing substances and yet fail to resist intracerebral inoculation of virus.

TABLE I

		Intracerebral Reinoculation		*Neutralization Tests*	
Monkey No.	*Clinical Course*	*Time After Onset*	*Result*	*Time After Onset*	*Result*
J 207	Arms and legs weak, later legs par., resid. par.	3 weeks	Resistant	2 weeks 8 weeks	— — —* — —
J 64	Legs par., arms weak, resid. par. in all limbs	6 "	"	6 "	— — —
R 62	Legs par., arms weak, resid. in legs	6 "	"	6 "	+**
J 230	Weakness in arms, ataxia, complete recovery	8 "	"	3 mos.	+
69	Right leg par., other limbs weak, residual in legs	6 mos.	"	7 "	—
V 8	Left leg par., other limbs weak, resid. in all limbs	7 "	"	8 "	+
B 79	Arms par., one leg par., residual one leg	10 "	"	7 "	—
T 6	Left arm par., legs weak, complete recovery	8 "	"	9 "	—

* — serum failed to neutralize
** + serum neutralized

Likewise, Jungleblut [12a] and Sabin and Olitsky [12b] have shown that recovered monkeys may resist reinfection, yet possess no serum neutralizing substances. Upon extending these studies, it was found that the serum of only 3 out of 8 convalescent monkeys, which were resistant to reinoculation, neutralized the virus although tested as long as 8 to 9 months after the onset of the disease (Table I). A number of investigators have shown that the sera of convalescent patients may fail to neutralize the virus. Recently we carried out an extensive study upon convalescent sera obtained from children admitted to the Willard Parker Hospital during the New York City outbreak in 1935.[13] The sera of a large group of children, both paralytics and non-paralytics, were tested upon admission, that is, within a few days of the onset of the disease. A number of those individuals who failed to neutralize the virus, were retested at short intervals up to 8 or 9 months after the onset. The composite results given in Table II indicate that the majority of these children failed to develop neutralizing substances in their sera. Moreover, 14 out of 82 paralytics had neutralizing substances within the first few days of illness and 2 of these in the pre-paralytic stage. Harmon and Harkins [14] also reported the presence of antibody in the serum of a patient tested in the pre-paralytic stage. One might say that these 14 individuals responded to the virus with antibody formation, very quickly. On the other hand, of 39 who lacked antibody upon admission, but 2 developed it within some months after the onset. This leads me to believe that poliomyelitis can develop in the presence of neutralizing substances.

TABLE II

Summary of Neutralization Tests During First Year of Convalescence of Individuals Whose Sera Failed to Neutralize in the First Week

	Paralytic		*Non-paralytic*	
Age Groups Years	*Number Tested*	*Number Neutralized*	*Number Tested*	*Number Neutralized*
1– 5	16	1	2	0
6–10	14	0	6	0
11–17	6	1	3	0
Adult	3	0	0	0
Total	39	2	11	0

ANTIBODY IS PROBABLY AN INDICATION OF IMMUNITY

From these data one may well inquire as to whether the presence of neutralizing substances is any indication of immunity. Up to the present time there is no such evidence in the experimental animal. This may be due to the fact that the level of neutralizing substances is not sufficiently high, or because the virus is neurotropic anti-

TABLE III

Summary of Neutralization Tests with Sera Taken in the First Week of the Disease and from Normals

	Paralytics			*Non-paralytics*			*Normals*		
Age Group in Years	*Number Tested*	*Sera Neutralized*	*Sera Failed to Neutralize*	*Number Tested*	*Sera Neutralized*	*Sera Failed to Neutralize*	*Number Tested*	*Sera Neutralized*	*Sera Failed to Neutralize*
1– 5	26	2	24	6	1	5	96	5	91
6–10	25	4	21	14	10	4	38	11	27
11–17	19	4	15	10	5	5	25	19	6
Adults	12	4	8	2	2	0	13	7	6
Totals	82	14	68	32	18	14	172	42	130

bodies cannot reach it. In humans there is evidence to indicate that neutralizing substances correlate to some extent with immunity. The incidence of the presence of neutralizing substance is at the onset of the disease decidedly higher in non-paralytics, than in paralytics (Table III). There is even more evidence in individuals over the age of 10, of whom more than 50 per cent show neutralizing substances, very much like the so-called normals (Table III). This decidedly smaller proportion of paralytics, especially over the age of 10 who possess antibody as compared to non-paralytics, or normals, suggests that the neutralizing substances help to limit or prevent infection.

THE SPECIFICITY OF THE NEUTRALIZING SUBSTANCES

Do the above inconsistencies between the presence of neutralizing substances and resistance disprove the idea that the former is a specific response to the virus? In other words, does it respond only from exposure to the virus, or can it result from other factors as developmental changes such as Jungleblut and Engle have suggested? [15] It might even result from exposure or reaction to a related antigen.

There are certain factors in the epidemiology of the disease on account of which it is difficult to explain the presence of neutralizing substances in adults on the basis of sub-clinical immunization.[1] Moreover, the antibody is present in the sera of individuals who reside where poliomyelitis is almost absent.[1]

On the other hand the distribution of the neutralizing substances in the sera of both urban and rural residents follows the trend of the Schick test and in diphtheria this immunity is well founded upon exposure.[1] It is absent from the sera of monkeys where the likelihood of exposure to the virus is remote. We have been unable to demonstrate neutralizing substance in the sera of monkeys of different ages, nor were they resistant to inoculation.

Moreover the failure to develop neutralizing substances in convalescents does not distract from the idea of the specificity of the antibody. One can scarcely assign the inability of those affected with poliomyelitis to a general constitutional defect in view of the fact that so many monkeys may fail to show its presence in convalescence. Likewise it does not seem to be an inhibition of antibody formation for neurotropic viruses. To this end the sera of 10 convalescents, some known to have poliomyelitis antibody and some that lacked its presence were tested against a neurotropic herpes virus. There was no correlation, and convalescents who failed to develop poliomyelitis neutralizing substances showed herpes antibodies.

In other virus diseases, antibody may be absent in convalescence, and so its absence in poliomyelitis convalescents should not appear unusual. Its presence or absence may depend upon the amount of virus that leaves the central nervous system to reach the antibody depots. The occasional development of antibody more than a year after the onset may be the result of hyperimmunization.[13]

A very strong argument in favor of the specificity of the antibody is the fact that it has been produced experimentally, only after exposure to the virus.

THE TREATMENT OF POLIOMYELITIS

Prior to 1931 serum was generally recommended in the treatment of preparalytic poliomyelitis, despite the lack of statistically controlled data to prove its worth. As a result of two separate controlled studies carried out during 1931,[16a, b] in which alternate cases

without paralysis were treated with serum, the mortality and paralysis rates were approximately the same for treated as untreated cases. In the experimental animal, where the disease is entirely neurotropic so that the virus contained in the central nervous system is walled off from the blood system by the Virchow-Robin spaces, extremely large doses of tested serum, of high neutralizing power, failed to affect the course of the disease.[17] Serum or whole blood in 100 to 300 c.c. amounts was given intravenously at the onset of symptoms and in one instance during the incubation period.

Should human poliomyelitis prove to be a systemic disease with secondary localization in the central nervous system, can better results be obtained with larger amounts of more potent serum? This question may well be asked, since untested convalescent serum was used in the 1931 New York outbreak, and so many of the specimens making up the pools of sera probably lacked neutralizing antibodies. However, the diagnosis of poliomyelitis cannot be made until meningeal manifestations are apparent and then the central nervous system is already involved. At best the serum could only prevent more virus from entering the central nervous system. Little of it could pierce the blood-central nervous system barrier any more than can salvarsan. Any that pierced the barrier, broken down through inflammation, would be ineffective in preventing further spread of the virus, for a virus that is already fixed to cells can grow in the presence of its own antibody.

Various nonspecific treatments have been advocated and tried. Among these are repeated lumbar puncture or spinal drainage. It seems hardly likely that the increased flow of spinal fluid can wash out the virus that is already fixed to the nerve cells. Adrenalin, ephedrin, and hypertonic solutions have been used to relieve the edema and congestion of the central nervous system, but without definite results. These measures may be of value in bulbar cases to relieve, temporarily, pressure upon the vital centers.

ACTIVE IMMUNIZATION

Because of the belief prevalent until recently that neutralizing substances were indicative of immunity to poliomyelitis, a considerable amount of the active immunity work in monkeys was gauged by the antibody response. Neutralizing substances have been produced in monkeys with skin inoculation of active virus,[1] virus-serum combinations,[1] attenuated[1] or germicidally treated, non-infected virus.[11, 18] I have also reported that some[18] animals which had received formalized virus were also resistant to intracerebral inoculation of virus. Other workers have failed to confirm this finding.[11] Whereas I used for the test dose what approximated a minimal infective dose of virus, these experimenters injected stronger doses. The reliability of such small doses has been questioned.[19] Further investigation upon this subject leads me to believe that it is unwise to use such small doses of virus to test animals.

Both the ricinoleated virus used by Kolmer[20] and the formalized virus used by ourselves produced neutralizing substances in children. Children whose serum failed to neutralize in the control period, appeared to respond better than monkeys. Aycock and Hudson[21a] and Kramer[21b] found children in an epidemic area developed antibody within several months. The former tested sera from a group of children from an epidemic focus during the 1935 North Carolina outbreak who had received formalized vaccine and compared the findings with a group of non-vaccinated children. The tests were carried out just before vaccination and sera

were again obtained approximately 2 months after the first dose of vaccine. Of these whose sera failed to neutralize in the first test, 10 of 19 vaccinated and 9 of 31 controls had developed neutralizing bodies.

The children whom we tested were in a poliomyelitis free area, and the tests were carried out within 3 to 4 weeks after the administration of the vaccine. It seems likely, therefore, that the antibody response was due to the vaccine. Altogether, 10,000 children received formalized virus, but the number was too small to give information as to the value of the vaccine from a comparison of the incidence of the disease in the vaccinated individuals and the controls. A report by the Kern County health authorities, who vaccinated nearly 4,000 individuals in an epidemic area, concluded as follows: "Although the results are not statistically conclusive, they strongly suggest an actual immunizing effect from the Brodie vaccine.[22]

The probability of obtaining an effective vaccine will depend upon several factors. In the first place should the human disease prove to be neurotropic as in the monkey, it will be difficult and perhaps impossible to develop a safe and effective vaccine. If, on the other hand, the human disease proves to be systemic, then by analogy with other diseases, a non-infective vaccine may produce immunity.

The measure of a person's reaction to the vaccine will be the presence of neutralizing substances. It will be necessary therefore to carry out further work with a view of determining the relationship of the presence of antibody to resistance to the disease. It will also be necessary to determine whether or not susceptible individuals are capable of producing neutralizing substances. The need for a susceptibility test is quite obvious.

The practical application of a vaccine will be in a large measure determined by whether a single or multiple strains exist. If multiple strains that are unrelated immunologically exist, it will be hardly feasible to prepare a polyvalent vaccine. Until recently the evidence has been that differences in strains were quantitative—that is, the results of differences in virulence. Recently several investigators have reported that qualitative changes exist. In our studies upon 3 strains, we found that one was almost identical with the passage strain and that the other two differed qualitatively. One must bear in mind the possibility of only one strain existing in the human, but that virus specimens can be modified in passage through the monkey. There is evidence of this in other virus diseases.

NASAL SPRAYS AS A METHOD OF PREVENTION

Tannic acid, alum, silver nitrate and other astringents [23] applied to the nasal mucosa protect monkeys against intranasal instillation of virus. Although the exact mechanism by which these substances can protect monkeys from intranasal infection is not definitely known, it is believed that they protect the olfactory nerves from the virus. The method was applied to humans in the summer of 1936 in Alabama by Armstrong of the U. S. Public Health Servive,[24] but the results were not encouraging. Armstrong felt that the failure was due in part to improper application of the spray.

On the other hand, there are other reasons which speak against the probable success of the nasal spray as a means of prevention in children, although it protects monkeys against nasal infection. Due to frequent blowing and picking of the nose, and other forms of trauma to the mucosa of children, the applications may not last sufficiently long to serve as a successful barrier, or the irritation produced may

weaken the olfactory barrier if the virus travels along the olfactory nerve. Secondly, the spray can be administered to young children only with difficulty. Even more important is the possibility that the virus may not travel along the olfactory nerves. It would seem more logical, therefore, to elucidate the portal of entry and path of the virus and let the future use of the nasal spray be guided by the results.

CONCLUSIONS

1. The virus of poliomyelitis in the experimental animal is strictly neurotropic and travels by way of the nerve tracts.
2. Neither the portal of entry nor the pathogenesis has been finally determined in the human. Therefore one cannot draw too close an analogy between the experimental and human diseases, nor apply all experimental results that bear upon the portal of entry and pathogenesis to the human.
3. The immunological data were studied upon which the following conclusions can be stated:
   a. The presence of serum neutralizing substances or the so-called antibodies and resistance to the disease do not necessarily correlate. However, in the human there is evidence to believe that the presence of antibody may be indicative of immunity.
   b. Recovery from poliomyelitis does not, as a rule, result in demonstrable antibodies or neutralizing substances.
   c. The so-called neutralizing substance can develop only as a result of specific exposure to the virus.
   d. There is evidence to believe that more than one strain of virus exists.
4. Neither convalescent serum nor any of the other available measures of treatment that have been advocated offer any hope for the prevention or limitation of paralysis in treated cases.
5. The value of active immunity as a preventive is undetermined. Further studies should be withheld until the human pathogenesis has been worked out; also further immunology, especially upon the question of strains.
6. Nasal sprays are effective in protecting the monkey. In the human the results are not encouraging and the reasons are discussed for believing that they may not protect the human.

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International Nursing Scholarships

THE establishment by the Central Committee of the American Red Cross of two scholarships to be awarded annually over a period of 5 years to an American nurse and to a nurse from another country to attend the courses offered by the Florence Nightingale International Foundation in London, England, was announced by Ida F. Butler, National Director of the American Red Cross Nursing Service, at the opening session of the National Nursing Biennial Convention, held in Kansas City, Mo., April 25.

The scholarships are established in memory of Clara Dutton Noyes, who served as director of the Bureau of Nursing of the American Red Cross during the World War, and as National Director of its Nursing Service from 1919 until the time of her death in 1936.

The Florence Nightingale International Foundation represents a living memorial to Florence Nightingale, the founder of modern nursing, and offers nurses everywhere an effective method of working specifically for peace through understanding. Inaugurated in 1934, by the League of Red Cross Societies and the International Council of Nurses, the Foundation provides an endowed trust for postgraduate education in public health nursing, and teaching and administration in schools of nursing at Bedford College, London, in coöperation with the British College of Nursing.

Almost 400 nurses from 47 countries of the world have taken the courses which are now under the aegis of the Florence Nightingale International Foundation. Seven of them have been American nurses.

Rural Syphilis—A Localized Outbreak

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IN Monroe County, Tenn., there occurred an episode which it is believed illustrates some of the important factors in the control of syphilis in rural areas.

Monroe County is situated in the extreme eastern part of the state. It is almost entirely rural and the population is 95 per cent native white.

In July, 1935, a boy from a CCC camp was discharged because he had syphilis. He had had sufficient treatment to render him supposedly noninfectious, namely, 5 doses of neosalvarsan and 5 doses of bismuth. He was presumably told that he would need further treatment before he would be cured.

The County Health Department was notified of the boy's discharge and treatment status. He did not report to the health department nor could he be found by the department, due to his going to another part of the county under an assumed name.

In October, 1935, he suffered a relapse, having mucous patches, condylomata and a skin rash, and reported to a physician for treatment.

Before applying for treatment he had directly infected 2 and directly or indirectly a 3rd rural prostitute.

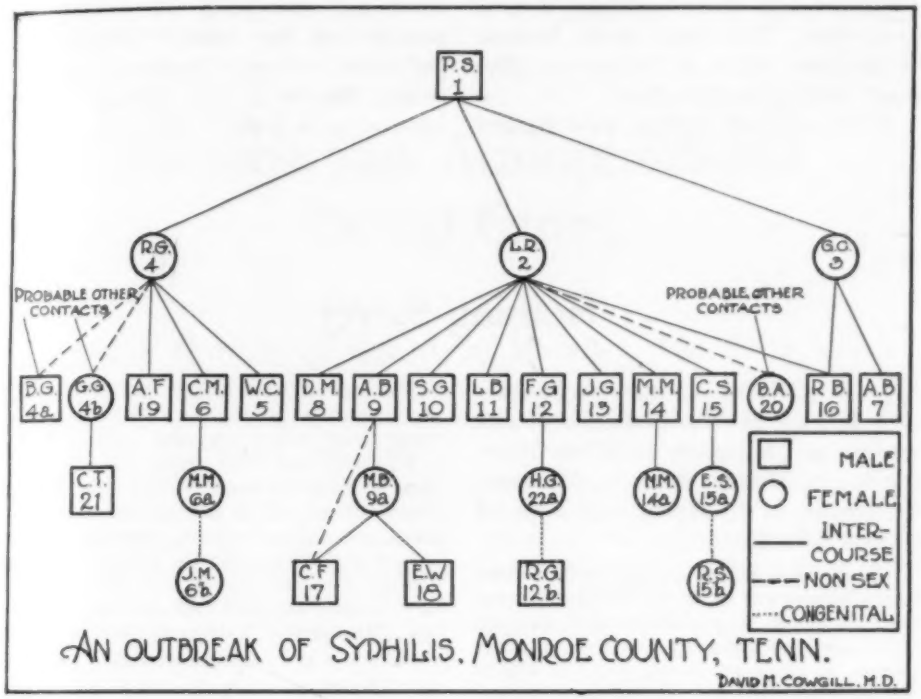
The private physician whom the patient consulted explained to him the nature of the disease, and since that time he has been faithful in taking treatments. He also revealed the names of his contacts after his return to the county to the physician who reported the case and contacts to the health department. The physician assisted in locating the contacts, and treated some of them as private patients.

The 3 girls with whom he had had contact were found and brought under treatment. All of the known contacts of these girls, some 23, were examined. Of these, 7 were negative and 16 positive. Three of the positive had other possible source of contacts. After being brought under treatment there were no further cases traced to these 3 girls until one of them discontinued treatment. She had an infectious relapse and infected 1 person. This lapse in treatment occurred in spite of repeated instruction as to the nature of the disease.

Since January, 1937, no further cases have been traced to this source. Now, February, 1938, it is possible that after the completion of the treatment of the last cases this epidemic will be closed. It is too early to be certain of this since 3 cases relapsed after having as many as 20 doses of neosalvarsan plus heavy metals, and infected other people.

Among those who have contracted the disease directly or indirectly from this source were 4 wives who were infected by their husbands. One daughter contracted the disease from her father and spread it to 2 other men.

The accompanying chart shows the



method of spread from the original case to the other persons. In some cases, contacts were 4 steps removed.

The spread of the disease may be considered as having 4 phases:

1. The initial case and his infection of 3 prostitutes
2. The spread contacts of the 3 prostitutes
3. The passage of the disease from those infected by prostitutes to others, principally family contacts
4. The ultimate bringing under control of all cases with the close of the episode and cessation of spread of the disease.

This episode is a minor one in the history of syphilis, but it illustrates dramatically the steps which must be taken to eliminate syphilis from a rural county.

CONCLUSIONS

1. The careless, ignorant, transient may cause epidemics of syphilis in his wanderings. When this type of person is found to be infected, he should be rigidly controlled by some agency.

2. The general practitioner is a very important element in the attack on syphilis. As in this case, the patient usually goes to the private physician first. Realizing the importance of the situation, the physician in this case obtained the names of the contacts and was instrumental in seeing that both the original case and the infected contacts were effectively treated.

3. Infected persons will usually give the names of contacts when questioned tactfully. These contacts, familial and extra-familial can be found if looked for and brought under treatment if infected. If they are treated with consideration they will usually continue their treatments.

4. Infectious relapses occurred even after as many as 20 doses of neosalvarsan plus heavy metal therapy. It is not believed that these were new infections.

5. When the main sources of infection in this particular episode were

found and kept under treatment, it came to a close. This came about because of the joint efforts of the private physician and the health officer.

If all cases of syphilis were studied from the standpoint of finding the sources and the contacts located and put under adequate treatment, syphilis would become a rare disease in the rural areas in a short time.

Housing Survey

ACCORDING to the Preliminary Report of the National Health Survey on "Adequacy of Urban Housing in the United States as Measured by Degree of Crowding and Type of Sanitary Facilities":

Three million urban families in the United States have fewer rooms in their homes than there are persons; one million live in dwellings with more than one and a half times as many persons as there are rooms; 700,000 live in dwellings with at least twice as many persons as there are rooms.

These estimates for urban families are based on figures obtained in the National Health Survey, 1935–1936, for a representative group of 83 cities. The number of persons in 740,000 urban households was recorded and also the number of rooms which any group occupied. Thus it was possible to calculate the number of persons per room for each of these households. . . .

The data at least suggest that in all parts of the country families on a fairly high economic level secure adequate housing. This is especially true with respect to any judgment of adequacy based on the type of sanitary facilities. It is among the relief and other low income groups, especially in the colored population, that the greatest variation occurs. For such groups the kind of sanitary facilities available varies greatly, depending on the part of the country and the size of the city in which they live, as well as on many other factors. . . .

Data have been collected in a project conducted by the U. S. Public Health Service, with the aid of financial grants from the WPA, in a house-to-house canvass of about 800,000 families including 2,800,000 persons in 83 cities, and 23 rural areas in 19 states.

Lactobacillus Acidophilus and Dental Caries*

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DENTAL caries, due to its widespread distribution and steadily increasing incidence, is worthy of the serious attention of students of public health problems. It is the purpose of this report to emphasize a few established facts in the hope that a clearer concept may be had of the etiology and control of the disease.

At the turn of the century W. D. Miller [1] advanced the hypothesis that there is present in the saliva an acidogenic substance which is responsible for the initial decalcification of enamel. He demonstrated that this substance was bacterial in origin. Inasmuch as a variety of organisms which may be responsible for the breaking down of carbohydrates is found in the mouth, it was Miller's belief that no one specific microörganism but that several acidogenic types were responsible for caries. It became more clearly understood that although Miller's theory was substantially reasonable, it was true that acidogenic bacteria can also be demonstrated in the mouths of caries-free individuals with the greatest regularity. More recently [2] it has been shown that although acid producing coccal forms and yeasts may inhabit the mouth with no apparent danger to the teeth, the presence of lactobacilli is invariably associated with caries. A renewal of caries activity in susceptible patients was always presaged by a marked increase of the oral lactobacilli as determined by quantitative culture of the saliva, while a drop in the lactobacillus count always signified an arrest of caries.

These findings were not very enthusiastically received since various investigators both at home and abroad were reporting the successful control of the disease by dietary means. All claimed beneficial results, but their theories as to how these results were obtained were in conflict with each other. Vitamins A and D were claimed to be specific anti-caries factors by some, while others were equally convinced that caries was a vitamin C deficiency disease. It was reported also that caries resulted from a deficiency of phosphorus and calcium in the diet. These theoretically dissimilar experimental diets were producing more or less satisfactory results. It might be inferred, therefore, that the enamel of the tooth is an unstable structure and that it is dependent for its maintenance on a variety of food factors, the absence of one or more of which results in caries. Such an inference is false, since histologically the enamel is extremely stable. At the time of the eruption of the tooth, the enamel con-

* Read before the Laboratory Section of the American Public Health Association at the Sixty-sixth Annual Meeting in New York, N. Y., October 6, 1937.

tains neither enamel forming cells nor a demonstrable circulatory system. In this respect the tissue is atypical and it is extremely doubtful if matured enamel can respond to metabolic influences. Furthermore there is no factual evidence that the structure of the tooth is of major importance in dental caries.

Notwithstanding these apparent inconsistencies, the disease is in a measure controllable by diet. It would appear, therefore, that the experimental diets each contained a factor in common which, unknown to the investigator, was actually responsible for the beneficial result. Studies conducted in the School of Dentistry * of the University of Michigan indicate that the carbohydrate element in the experimental diets was such a factor. This possibility was brought to our attention because of the unusually low incidence of caries in an experimental group of children on a diet deficient in vitamins and minerals but almost completely sugar-free. In other words, caries was reduced on a diet that was not even suitable for normal growth and development. When large amounts of sugar in the form of candy were included in the diet, new caries soon appeared, and we observed an increase in caries when an excess of sugar was added to diets nutritionally adequate. This is explainable by the fact that the number of oral lactobacilli is proportionate to the amount of carbohydrate in the diet. Lactobacillus counts were made to rise and drop at will by increasing and restricting the amount of sugar and starch in the diet. Sugar was restricted to a greater or lesser extent in all of the beneficial diets referred to. No particular significance was attached to sugar by any of these authors other than the supposition that artificially sweetened foods were too often consumed at the expense of nutritional necessities. Whether or not these bacteria are actually the sole cause of the disease is of academic importance. Of more immediate significance is the fact that they bear a diagnostic relationship to caries. Through quantitative estimations we were able to demonstrate that dental caries is not related to the nutritional adequacy of the diet and that the proprietary mineral and vitamin preparations being sold for the prevention of the disease are entirely ineffective.

The method used in making the quantitative lactobacillus estimation is similar to that described by Hadley.[3] In order to obtain uniform volumes of saliva, the subject is instructed to chew a small piece of paraffin making it a point to shift it from one side of the mouth to the other so as to dislodge as much of the detritus from the tooth surfaces as possible. As the saliva is accumulated in the mouth it is expectorated into a large sterile tube. Three minutes is arbitrarily selected as the time for collecting the specimen. The specimen is thoroughly shaken, after which 0.1 c.c. of it is spread evenly over a tomato agar plate with a glass spreader. Glucose acid broth is also inoculated as a qualitative check. After a 4 day incubation the number of organisms per c.c. of saliva is estimated by multiplying the number of *L. acidophilus* colonies on the plate by 10.

The tomato agar used is a modification of Kulps medium, prepared in the following manner:

Mixture A—Add 10 gm. of Difco peptone and 10 gm. of Difco peptonized milk to 400 c.c. of juice filtered (through cotton) from a good quality of canned tomatoes. Heat gently to dissolve the peptone and peptonized milk. Unnecessary heating of the tomato juice should be avoided. The reaction of the solution is adjusted to pH 5.0 with lactic acid.

* The dental caries studies of the Michigan group were supported by grants from the Children's Fund of Michigan and The Horace H. Rackham Foundation.

Mixture B—Add 25 gm. of dried agar to 600 c.c. of distilled water and autoclave to dissolve the agar. Just before removing B from the autoclave, bring A to the boiling point. Then mix A and B while both are hot and filter through a thin layer of absorbent cotton. Distribute in containers and sterilize by heating in the autoclave at 120° C. for 8 minutes. The properly prepared medium is a clear agar, of a light brown color, having a final reaction of pH 5.0.

One disadvantage of this technic is the difficulty of obtaining uniform samples of saliva. At best, cultures so taken give but an approximate indication of the actual number of organisms on the tooth surfaces. Consequently before attempting to reduce the oral lactobacilli through dietary change, preliminary counts on 3 successive days are made to determine the average count. It is important to obtain these samples at the same time of day for each individual and never immediately after a meal since the number of bacteria in the saliva always falls after eating.

In the treatment of severe dental caries the patient is first placed on a diet in which the carbohydrate is moderately restricted. This usually involves the omission of all forms of confection, cake, pie, ice cream, and other artificially sweetened desserts. A lactobacillus count is made after 2 weeks, and if there has not been a precipitous drop more severe dietary restrictions are made. Occasionally it is necessary to resort to a typical high fat diabetic diet. These cases require intelligent handling by physicians with a thorough knowledge of dietetics. Although we have reason to believe that an adequate diet is not necessary for the prevention of dental caries it is of course essential for normal growth and good health. The carbohydrates cannot be casually stricken from the diet without regard for the caloric requirement of the patient. By trial and error a diet is finally found on which the lactobacillus counts become negative or only sporadically positive. By this method caries activity was arrested in about 80 per cent of the cases under observation. A few of the highly susceptible patients have continued to have lactobacillus overgrowths despite the most drastic dietary treatment. There are some individuals, comprising about 3 per cent of our population, who seem to be immune to dental caries. Their cultures, both saliva and stool, are consistently negative for lactobacilli even when they consume candy and other sweets in excess.

Summarizing, the studies conducted by the Michigan group indicate that:

1. Dental caries activity is not related to the nutritional adequacy of the diet.
2. The disease is not arrested by supplementing the diet with mineral and vitamin preparations.
3. A diagnostic relationship exists between the growth of oral lactobacilli and dental caries activity.
4. The number of oral lactobacilli is proportionate to the amount of carbohydrate in the diet.
5. Rampant dental caries can be effectively treated by restricting the carbohydrate in the diet.

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Survival of E. Typhi in Sewage Treatment Plant Processes*

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THE importance of typhoid fever as an epidemic disease has apparently diminished during recent decades, but it is wise to remember that typhoid has neither been eliminated nor conquered. Barriers have been placed around it to prevent its spread, but its menace is ever with us. The survival of intestinal pathogens in water and sewage has been the subject of study for many years since the early work of Jordan, Russell, and Zeit [1] in 1904. Edwards [2] in 1930 reviewed the research of various French and German investigators. Heukelekian and Schulhoff [6] in 1935 presented a comprehensive historical review of the literature which need not be repeated here. The difficulties in the way of quantitative investigations have until recently been insuperable. Wilson and Blair [3, 4] reported success using a bismuth sulphite medium. Ruchhoft found the original Wilson-Blair medium too inhibitive for *E. typhi* in his work for the Sanitary District of Chicago; subsequently he modified the media and reported more successful isolations. Heukelekian and Schulhoff [6] in 1935 reported the development and use of a brilliant green nutrient agar medium.

In the investigations described in this paper, Difco bismuth sulphite medium† was used. One ml. portions of proper dilutions made up with physiological saline solution were added to the solidified pour plates and spread uniformly over the surface of the medium by means of a sterile needle, care being taken to prevent any portion from reaching the outer edge and running down between the medium and the glass plate. Plates were then dried at about 40° C. and not exceeding 45° C. in a glass-top open bottom box provided with side ventilation holes. Incubation for 36 to 48 hours was required for best plate counts. *E. typhi* colonies on this medium have a dry, jet black color, button-like appearance, and are frequently surrounded by a metallic halo. Most sewage organisms are so successfully inhibited as to cause negligible interference.

A. ISOLATION OF E. TYPHI FROM RAW SEWAGE

During January, February, and March, 1937, 9 samples of Palo Alto, Calif., raw sewage were examined for *E. typhi*. Of a total of 55 1 ml. por-

* Abstract of a paper read before the Public Health Engineering Section of the American Public Health Association at the Sixty-sixth Annual Meeting in New York, N. Y., October 5, 1937.

NOTE: Tables and charts have retained original numbers, since the complete paper may be published elsewhere later.

† Prepared by Digestive Ferments Co. The writers wish to acknowledge the courtesy of this company in supplying the media used in these studies.

TABLE I

Survival of E. Typhi in Raw Sewage

	Stored Indoors				Stored Outdoors					
					Outdoor Temp. ° C.					
Storage Days	Temp. ° C. When Sampled	pH	E. Typhi per ml.	Per cent Surviving	Temp. ° C. When Sampled	Min.	Max.	pH	E. Typhi per ml.	Per cent Surviving
0	20	7.4	6,500,000		20	0	9	7.4	5,000,000	
1	20	7.3	4,400,000	68	7	5	9	7.4	5,000,000	100
2	20	7.3	4,400,000	68	9	3	9	7.4	5,500,000	110
3	18	7.4	700,000	11	7	5	8	7.4	2,000,000	40
5	18	7.4	16,000	0.25	7	1	9	7.4	30,000	0.6
6	20	7.4	12,000	0.2	13	5	13	7.2	30,000	0.6
7	20	7.4	7,500	0.1	11	2	11	7.2	12,500	0.3
9	20	7.4	2,300	0.03	10	7	10	7.3	15,000	0.3
10	20	7.5	1,500	0.02	12	6	13	7.3	9,000	0.2
12	18	7.6	180	0.003	7	0	8	7.3	5,000	0.1
14	14	7.8	30	0.0005	6	1	9	7.3	2,600	0.05
16	19	7.8	4	0.0001	8	7	9	7.4	2,200	0.04
19	17	7.8+	1		9	8	13	7.4	250	0.003
27	18	7.8+	0	0	13	3	18	7.6	5	0.00001
33									0	0

Average Max.-Min. temperature for period—7° C.

tions plated in this group, 9 positive isolations were made from separate 1 ml. portions. Four samples collected in May, 1937, were plated but no successful isolations were made in the 21 1 ml. portions examined.

During February and March, 3 samples of raw San Francisco sewage entering the Golden Gate Park activated sludge plant were plated about 18 hours after collection. No typhoid bacilli were isolated from the 23 1 ml. portions examined.

B. STUDIES OF THE SURVIVAL OF E. TYPHI IN RAW SEWAGE

Two liter portions of raw Palo Alto sewage were placed in 2 2½ liter wide-mouth glass jars fitted with rubber stoppers in which inverted U tubes were placed for ventilation. They were then inoculated with a 24 hour agar culture

TABLE II

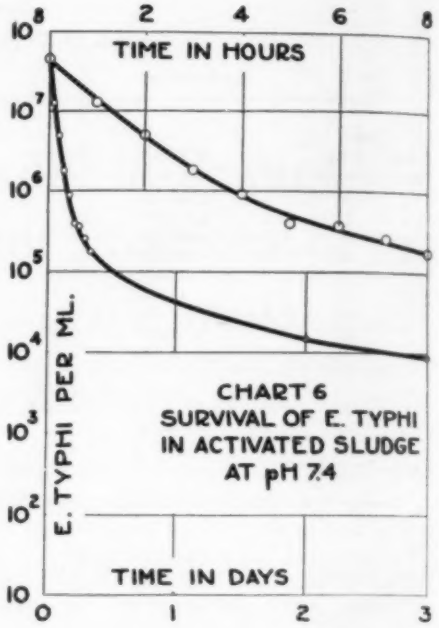
Raw Sewage + Sludge, Simulating a Septic Tank

	Unmixed Supernatant				Mixed Scum, Supernatant and Sludge		
Storage Days	Temp. ° C.	pH	E. Typhi per ml.	Per cent Surviving	pH	E. Typhi per ml.	Per cent Surviving
0	16.5	6.8	70,000,000		6.8	70,000,000	
1	17	6.6	60,000,000	86	6.6	65,000,000	93
2	21	6.5	21,000,000	30	6.5	35,000,000	50
3	19	6.4	20,000,000	29	6.4	12,000,000	17
4	18.5	6.4	1,800,000	2.6	6.4	1,600,000	2.3
6	18	6.4			6.4	45,000	0.6
7	18	6.4	9,000	0.001	6.4	45,000	0.6
9	17	6.4	650	0.0001	6.5	6,000	0.09
11	15	6.6	300	0.00004	6.6	3,200	0.04
13	15	6.6	100	0.00001	6.6	3,700	0.05
16	19	6.7	1		6.7		
18	17.5	6.7	25		6.7	650	0.009
22	17.5	6.6	3		6.6	240	0.003
24	17.5	6.8	1		6.8	90	0.0008
27	17	6.8	0		6.8	30	0.0002

of Rawlings' strain of *E. typhi*, one having an initial *E. typhi* count of 6,500,000 per ml. and the other 5,000,000. One jar was kept at room temperature exposed to north light and the other was placed outdoors exposed to sunlight during a part of the day. The contents of each jar was thoroughly mixed before sampling.

Table I shows that 11 per cent of the typhoid organisms stored at room temperature survived for 3 days. At 7 days only 0.1 per cent remained, but positive isolations were made in 1 ml. portions through the 19th day.

Typhoid organisms in sewage stored outdoors at lower temperature survived for a longer period. Positive isolations from 1 ml. were made through the 27th day. The pH range (7.2 to 7.8) in each instance was not unfavorable.



C. SURVIVAL OF E. TYPHI UNDER CONDITIONS SIMULATING A SEPTIC TANK

Two liters of raw Palo Alto sewage plus 400 ml. of fresh sludge were placed in each of two jars, as under B; *E. typhi* were added and the jars stored in a hood at room temperature without being exposed to sunlight. Samples were taken from the relatively clear liquor between the scum and sludge of one container and from the mixed contents of the other.

The data in Table II reveal little difference in typhi counts in the supernatant and mixed samples up to the 4th day, when only 2 per cent remained in either case. In all but 2 instances, more typhoid bacilli were found in the mixed portions. Successful isolations in 1 ml. were made in the supernatant for 24 days and in 0.1 ml. portions of the mixed sewage for 27 days.

D. SURVIVAL OF E. TYPHI IN ACTIVATED SLUDGE

In the following experiments, activated sludge was collected from the San Francisco Golden Gate Park plant and aerated in the laboratory by means of glass diffusers set in wide-mouth glass jars. Activated sludge was mixed with raw Palo Alto sewage. *E. typhi* counts were made on unsettled samples.

1. Activated sludge collected one evening was allowed to stand over night and the supernatant replaced by raw sewage. After aeration for 24 hours followed by settling, the supernatant was replaced with raw sewage, *E. typhi* added to give an initial count of 37,500,000 per ml., and the experiment started. An *E. typhi* reduction of 91 per cent in 6 hours, 95 in 8 hours, and 99.9 in 24 hours of aeration was observed; the pH rose from 6.8 to 7.6 in the first 4 hours.

2. Four liters of activated sludge in a 4½ liter jar were aerated for 5 days, fresh raw sewage being used to replace the supernatant on the 2nd and 4th days. On the 5th day, *E. typhi* were added and aeration continued for 6 days; the pH remaining at 6.4. *E. typhi* counts showed a reduction of 96 per cent in 6 hours and 99 in 8 hours.

3. In an experiment similar to the one described under 2, aeration was maintained for 2 days prior to the addition of *E. typhi*; with no raw sewage added the pH dropped to 6.0. A 97 per cent reduction in *E. typhi* was indicated in 6 hours and 99 in 8 hours. As in the previous studies, a few organisms survived several days of aeration.

TABLE VI

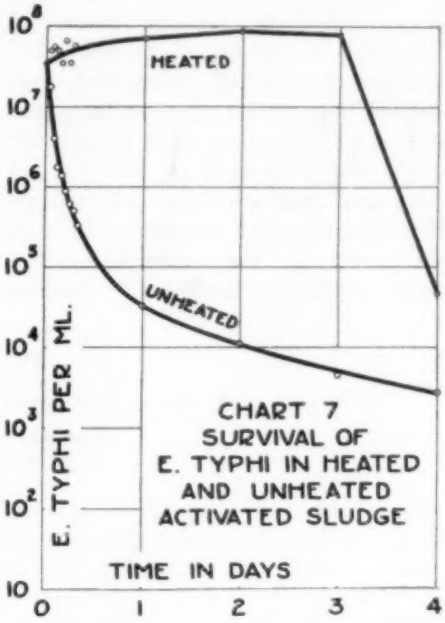
Survival of E. Typhi in Activated Sludge at pH 7.4

Aeration Time	*Temp.* ° *C.*	*pH*	*E. Typhi per ml.*	*Per cent Surviving*
0	17.5	7.4	45,000,000	..
1 hr.	....	...	13,000,000	29
2 hr.	....	...	5,000,000	11
3 hr.	....	...	1,800,000	4
4 hr.	18.5	7.4	900,000	2
5 hr.	....	...	400,000	0.9
6 hr.	18.5	7.4	375,000	0.8
7 hr.	....	...	260,000	0.6
8 hr.	18.5	7.4	175,000	0.4
24 hr.	17.5	7.4		....
2 days	15	7.4	14,500	0.03
3 days	16.5	7.4	9,000	0.02

4. In an experiment using the same batch of activated sludge as under 3, with raw sewage added once each day, the pH was constant at 7.4. In 6 hours a reduction of 99 per cent in *E. typhi* numbers was noted (see Table VI and Chart VI).

5. A study was next made of the effect of protozoa and non-spore-forming organisms on the survival of typhoid organisms in activated sludge. A sample of fresh activated sludge was thoroughly mixed with raw sewage and divided into equal 2 liter portions. One portion was then autoclaved at 80° to 95° C. for 20 minutes and water cooled to room temperature immediately thereafter. *E. typhi* were added to both and aeration started.

The results shown in Table VII and Chart VII are of interest. The pH of the heated sludge continued to rise throughout the 6 day aeration period; after the 1st day it dropped in the control jar. In the heated mixture an increase in *E. typhi* was observed for 3 days; a very abrupt reduction followed. The increase in typhoid organisms may have been caused by some hydrolysis of organic matter which furnished food, or by the lack of competitive and predatory types of organisms or both. In the control only 1 per cent survived 6 hours of aeration. After 4 days of aeration very little difference was noted in the per cent surviving in either container. This experiment seems to suggest rather definitely that biological activity and not aeration *per se* is responsible for the reduction of typhoid organisms in the activated sludge process.



E. TRICKLING FILTER STUDIES

A search of the literature having failed to reveal any data on the survival of typhoid organisms in sewage during passage through a trickling filter, it was decided to investigate the behavior of typhoid organisms undergoing

TABLE VII

Survival of E. Typhi in Heated and Unheated Activated Sludge

	Unheated Sludge				Previously Heated Sludge			
Aeration Time	*Temp. ° C.*	*pH*	*E. Typhi per ml.*	*Per cent Surviving*	*Temp. ° C.*	*pH*	*E. Typhi per ml.*	*Per cent Surviving*
0	17	7.0	50,000,000		19.5	7.2	45,000,000	...
1 hr.	....	...	18,000,000	36	....	...	50,000,000	110
2 hr.	17.5	7.2	4,000,000	8	18	7.4	55,000,000	120
3 hr.	....	...	1,700,000	3.4	....	...	50,000,000	110
4 hr.	18	7.2	1,400,000	2.8	18	7.4	45,000,000	100
5 hr.	....	...	900,000	1.8	....	...	50,000,000	110
6 hr.	18.5	7.2	600,000	1.2	18.5	7.4	65,000,000	145
7 hr.	....	...	500,000	1.0	....	...	45,000,000	100
8 hr.	19	7.2	325,000	0.6	19	7.6	55,000,000	120
24 hr.	17.5	7.1	32,500	0.06	17.5	7.3	70,000,000	155
2 days	17.5	6.8	11,000	0.02	17.5	8.0	87,000,000	195
3 days	17	6.2	4,500	0.008	17	8.0	80,000,000	180
4 days	17	6.2	2,700	0.006	17	8.2	45,000	0.1
6 days	17.5	6.0	160	0.0003	17.5	8.4	10,000	0.02

this type of treatment. Accordingly, an experimental unit was constructed at the Palo Alto sewage plant. A filter was made up of a 6½′, 24″ diameter section of galvanized, corrugated iron culvert pipe set on a grid of 2 by 4's nailed on edge, spaced ½″ apart, and supported by 8 by 8's. A galvanized sheet-iron tray collected the filter effluent and permitted free air movement to the underdrains. A rotary distributor having ½″ diameter arms drilled with 3/16″ holes was mounted on a ¾″ riser pipe. Six feet of 1¼″–2½″ sound, blue, crushed rock was used. The distributor revolved 3″ above the surface of the rock and was driven by a variable speed motor.

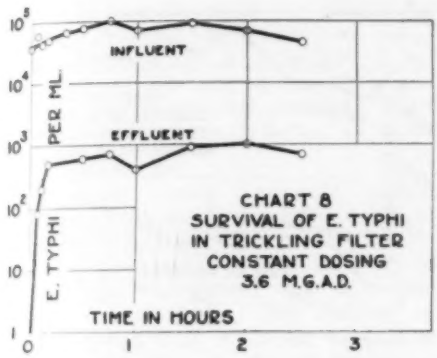
Palo Alto clarifier effluent was conveyed to a variable capacity gear pump by a 1″ pipe fitted with a 14 mesh screen. A tee connection and needle valve on the suction side of the pump permitted the addition of typhoid broth

TABLE VIII

Survival of E. Typhi in Trickling Filter—Constant Dosing—3.6 m.g.a.d.

	Influent			Effluent		
Time	*Temp. ° C.*	*pH*	*E. Typhi per ml.*	*pH*	*E. Typhi per ml.*	*Per cent Surviving*
Start	22	7.3	38,000	8.0	...	...
3 min.	....	...	60,000	...	80	0.1
5 min.	....	...	42,000	...	200	0.5
10 min.	....	...	50,000	...	500	1.0
20 min.	....	...	65,000	...	...	...
30 min.	22.5	7.4	75,000	8.0	600	0.8
45 min.	....	...	100,000	...	700	0.7
1 hr.	....	...	70,000	...	400	0.6
1½ hr.	....	...	90,000	...	900	1.0
2 hr.	....	...	70,000	...	1,000	1.4
2½ hr.	23	7.3	45,000	8.0	700	1.6

Influent B.O.D. = 220 p.p.m.
Effluent B.O.D. = 55 p.p.m.



cultures. To allow for sedimentation, collection of composite samples and chlorination when desired, a 15 gal. steel tank 22″ in diameter was used to receive the filter effluent.

The filter was placed in operation with constant dosing for a period of 1 month before experiments were started. B.O.D.,* D.O., N, settleable solids, oxygen consumed, and stability determinations were made to check filter efficiency during the period in which the filter-bed was built up. Palo Alto sewage is strictly domestic except for the waste from one cannery, has a high B.O.D., no D.O., and about 5 p.p.m. H_2S. The settled sewage had a B.O.D. of about 300 p.p.m. and a pH of 7.2–7.4. The filter effluent contained from 5 to 8 p.p.m. D.O. and had a pH of 7.8–8.0. Solids which were not unlike activated sludge in appearance continually sloughed from the trickling filter. Filter flies bred constantly during the test runs.

1. *Constant Dosing at Rate of 3.6 m.g.a.d.*†

A broth culture of *E. typhi* was added to the sewage for 3 hours and counts made at intervals shown in Table VIII. The data secured and the curves plotted on Chart VIII indicate a reduction of about 99 per cent with influent and effluent curves being practically parallel. During the experiment a B.O.D. of 220 p.p.m. was reduced 75 per cent as measured by a settled effluent composite sample. In the tests which follow, B.O.D. reductions were determined by the same method, but in all instances *E. typhi* counts were made of the unsettled filter effluent.

2. *Constant Dosing at Rate of 5.4 m.g.a.d.*

As under 1, typhoid organisms were applied for 3 hours and counts made at frequent intervals. Over a 4 hour period typhoid numbers were reduced about 96 per cent. A 75 per cent reduction of the 260 p.p.m. B.O.D. was obtained.

TABLE X

Survival of E. Typhi in Trickling Filter—Constant Dosing—6.6 m.g.a.d.

	Influent			*Effluent*		
Time	*Temp. ° C.*	*pH*	*E. Typhi per ml.*	*pH*	*E. Typhi per ml.*	*Per cent Surviving*
Start	23.5	7.2	5,000	7.9	..	...
5 min.	....	...	1,200	...	30	2.5
10 min.	....	...		...	50	...
15 min.	....	...	60,000	...	10	0
30 min.	....	...	140,000	...	500	0.3
45 min.	....	...	60,000	...	1,400	2.3
1 hr.	....	...	27,500	...	850	3.1
1¼ hr.	....	...	11,000	...	400	3.6

Influent B.O.D. = 300 p.p.m.
Effluent B.O.D. = 50 p.p.m.

3. *Constant Dosing at Rate of 6.6 m.g.a.d.*

Data secured in this experiment and listed in Table X are interesting for two reasons: (1) a 99 per cent reduction of typhoid organisms was secured, and (2) the correlation between effluent and influent *E. typhi* counts

* B.O.D. = biochemical oxygen demand
D.O. = dissolved oxygen
N. = nitrogen

† m.g.a.d. = million gallons per acre per day.

was very marked although the number of organisms varied considerably. The B.O.D. of 300 p.p.m. was reduced 80 per cent.

4. *Constant Dosing at Rate of 12 m.g.a.d.*

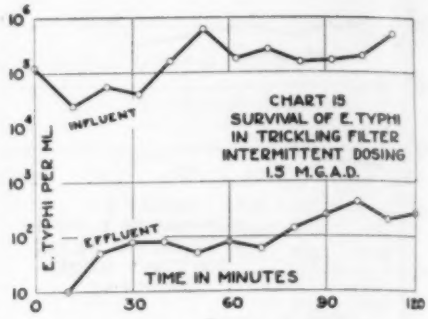
In a run at high dosing rate for 1 hour, it was surprising to obtain an *E. typhi* reduction of about 95 per cent.

5. *Intermittent Dosing Cycle—Rate 1 m.g.a.d.—2 Minutes Dosing Followed by 6 Minutes Resting*

In this experiment 5,500,000 *E. typhi* per ml. were added for 2 minutes and the filter operated on above cycle. The B.O.D. was 300 p.p.m. and a 75 per cent reduction was secured. *E. typhi* were recovered in the effluent in 0.1 ml. portions up to 1 hour and 6 minutes, but the highest count at any time was only 30 per ml. Composite samples collected at ½, 1, and 2 hour intervals contained only 10 typhoid organisms per ml.

6. *Intermittent Dosing Cycle—Rate 1.4 m.g.a.d.—4 Minutes Dosing Followed by 6 Minutes Resting*

A concentration of 650,000 *E. typhi* per ml. was added for 1 minute and effluent samples plated over a 2 hour period. The sewage B.O.D. of 350 p.p.m. was reduced 85 per cent. Viable organisms were recovered in 0.1 ml. portions in only 2 of 12 samples;



in none of the ½, 1, or 2 hour composite samples of the effluent.

7. *Intermittent Dosing Cycle—Rate 1.7 m.g.a.d.—3 Minutes Dosing Followed by 3 Minutes Resting*

E. typhi were added for 2 minutes in a concentration of 1,000 per ml. No recoveries were made in the effluent in 0.1 ml. portions. The sewage B.O.D. was 190 p.p.m. and a reduction of 80 per cent was secured.

8. *Intermittent Dosing Cycle—1.5 m.g.a.d. Rate—3 Minutes Dosing Followed by 7 Minutes Resting*

To add typhoid bacilli to the sewage over an extended period during intermittent dosing, it was necessary to open and close the needle valve between the flask of organisms and the

TABLE XV

Survival of E. Typhi in Trickling Filter—3 Minutes Dosing, 7 Minutes Resting—Rate 1.5 m.g.a.d.

	Influent			*Effluent*		
Time	*Temp.* ° *C.*	*pH*	*E. Typhi per ml.*	*pH*	*E. Typhi per ml.*	*Per cent Surviving*
Start	24	7.2	125,000	7.8	0	....
10 min.	..	...	25,000	...	10	0.04
20 min.	..	...	55,000	...	50	0.09
30 min.	..	...	40,000	...	80	0.2
30 min. Composite	..	...		...	90	....
40 min.	..	...	160,000	...	80	0.05
50 min.	..	...	600,000	...	50	0.008
1 hr.	..	...	175,000	...	80	0.05
1 hr. Composite	..	...		...	30	....
1 hr. 10 min.	..	...	260,000	...	60	0.02
1 hr. 20 min.	..	...	150,000	...	140	0.09
1 hr. 30 min.	..	7.2	165,000	7.6	240	0.14
1½ hr. Composite	..	...		...	30	....
1 hr. 40 min.	..	...	200,000	...	420	0.2
1 hr. 50 min.	..	...	500,000	...	200	0.04
2 hr.	Inoculation stopped			...	260	....
2 hr. Composite	..	...		...	300	....

Influent B.O.D. = 270 p.p.m.
Effluent B.O.D. = 40 p.p.m.

pump each time the motor was started and stopped. *E. typhi* counts therefore varied considerably as shown in Table XV. A reduction of 85 per cent in the 270 p.p.m. B.O.D. of the sewage was obtained. Chart XV shows a consistent reduction of about 99.9 per cent.

9. *Intermittent Dosing Cycle—2.8 m.g.a.d. Rate—5 Minutes Dosing Followed by 10 Minutes Resting*

In this experiment a B.O.D. reduction of 70 per cent was secured with a sewage strength of 400 p.p.m. The addition of *E. typhi* and the dosing cycle were manually controlled. Data in Table XVI plotted on Chart XVI show influent and effluent counts parallel with a reduction of about 99.9 per cent.

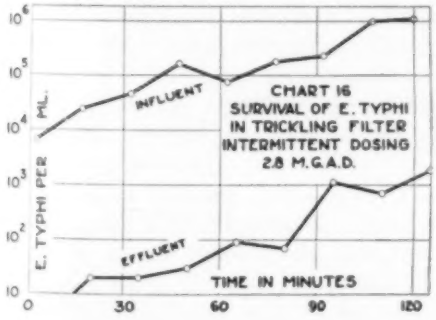
TABLE XVI

Survival of E. Typhi in Trickling Filter—5 Minutes Dosing, 10 Minutes Resting—Rate 2.8 m.g.a.d.

	Influent			*Effluent*		
Time	*Temp.* ° *C.*	*pH*	*E. Typhi per ml.*	*pH*	*E. Typhi per ml.*	*Per cent Surviving*
Start	24.5	7.3	6,500	7.8	..	....
5 min.	....	...		...	<10	....
20 min.	...	...	24,000	...	20	0.08
35 min.	....	...	45,000	...	20	0.04
50 min.	....	...	160,000	...	30	0.002
1 hr. Composite	....	...		...	40	....
1 hr. 5 min.	....	...	75,000	...	90	0.12
1 hr. 20 min.	....	...	175,000	...	70	0.04
1½ hr. Composite	....	...		...	60	....
1 hr. 35 min.	....	...	230,000	...	1,100	0.47
1 hr. 50 min.	....	...	1,000,000	...	700	0.07
2 hr. Composite	....	...		7.8	100	....
2 hr. 5 min.	....	7.3	1,100,000	...	1,850	0.16

< = less than

Influent B.O.D. = 400 p.p.m.
Effluent B.O.D. = 110 p.p.m.



SUMMARY AND CONCLUSIONS

1. Use of the highly selective modified Wilson-Blair bismuth-sulphite medium makes quantitative studies of the behavior of *E. typhi* in sewage and sewage treatment processes possible.

2. Successful isolations of *E. typhi* in 1 ml. portions of raw Palo Alto sewage were made in several instances. The isolation of viable typhoid organisms in the sewage of a city having a high standard of sanitation and without having had an outbreak of typhoid fever in 30 years emphasizes the need for constant vigilance if effective barriers are to be maintained between infectious material and susceptible hosts.

3. The findings of early investigators on the longevity of the typhoid bacillus in sewage has been confirmed, it having been shown that a rapid decrease occurs for 3 or 4 days, after which survivors may persist for several weeks. The influence of temperature was noted as by other investigators, sur-

vival time being longer at lower temperatures.

4. Under conditions simulating a septic tank, it was found that 2 or 3 per cent of the typhoid organisms survived for 4 days both in the supernatant and in the mixed contents of the container. After the 4 day period, there were fewer survivors in the supernatant, though they were isolated in 1 ml. portions for 24 days. They were still found in 0.1 ml. portions of the mixed sludge, scum and supernatant through 27 days.

5. Experiments with activated sludge indicate that a reduction of 90 to 99 per cent in typhoid organisms can be expected during 6 hours aeration, and that in most instances only 1 to 3 per cent will survive. An experiment with activated sludge heated sufficiently to destroy or inactivate protozoa and non-spore-forming bacteria, indicated that biological activity and not aeration *per se* is responsible for the reduction in *E. typhi* in activated sludge. An increase of *E. typhi* occurred during 3 days of aeration of the previously heated sludge. A control batch showed a normally expected decrease during the same time.

No tests were conducted on the survival of *E. typhi* during the digestion of activated sludge.

6. In the studies herein reported, a trickling filter operating intermittently at effective rates up to 2.8 m.g.a.d. removed 99.9 per cent of typhoid organisms in sewage. Reductions of 96 to 99 per cent were secured at constant dosage rates up to 6.6 m.g.a.d. and a 95 per cent reduction at 12 m.g.a.d. With alternate dosing and resting cycles, high concentrations of typhoid organisms were added for 1 or 2 minutes with but few viable organisms passing through the bed.

Considering the possibility of sampling errors involved in experimental work of this kind, the data secured seem surprisingly consistent and the curves of *E. typhi* counts in the influent and effluent are reasonably parallel, allowance being made for lag in passage through the filter.

It is apparent that two commonly used processes for secondary biological treatment of sewage, namely, activated sludge and trickling filtration, may be expected to reduce greatly typhoid organisms present in sewage, and are, therefore, effective barriers for the protection of public health.

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Vol. 28

American Journal of Public Health
and THE NATION'S HEALTH

Official Monthly Publication of the American Public Health Association

Volume 28 June, 1938 Number 6

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AN AMERICAN MUSEUM OF HEALTH

FOR nearly eight years the Association's Committee on American Museum of Hygiene has been moving steadily toward its goal, the establishment of the first of a series of permanent Museums of Health in this country. As is usual with those who advance new ideas and new methods, the committee has been forced to make capital of small gains and to work often without a great deal of encouragement. There are evidences now of their patient efforts coming to fruition.

The idea brought forward again and again by the committee is catching on—that the museum concept is readily adaptable to the education of the public in matters of health, that it provides a new and different approach to the problem of teaching the average man and woman the facts about their own physical organization, the personal application of medical and public health progress, and the way to better and more healthful living. The essence of the museum method of teaching is pictorialization and illustration, the capturing of dramatic facts which are now buried in verbiage in most of our health education programs and consequently remain misty abstractions in the public mind. It is, of course, the exhibit method on a grand scale, but the coördinated, unified exposition of man and his health at which the committee aims, moves into focus not a function nor an organ nor a specific health hazard as many health exhibits do, but the whole man and his environment.

The museum of health, as a new instrument for health education in this country, has passed successfully the acid-test of investigation of those who have money to give. The Oberlaender Trust, the Carnegie Corporation, and the Josiah Macy, Jr. Fund have considered the objectives of the Committee on American Museum of Hygiene worthy of financial support, thus giving great impetus to its work.

With the opening of the New York World's Fair, 1939, the public and the medical and public health professions will have the opportunity to see the first flowering of the committee's plans. A Medical and Public Health Building, the first ever to be set aside at a World's Fair in this country for exhibits in this field, is an important part of the exposition " Building the World of Tomorrow,"

and for its existence the committee is largely responsible. The Fair was a challenge to the committee as a time and place to do a tremendously effective job in mass health education and at the same time to lay the groundwork for a permanent museum. The thought throughout in the development of the Medical and Public Health Building has been that the exhibits would be transferred at the close of the Fair to an American Museum of Hygiene. The New York City Administration has given assurance that a building will be available and the establishment of a permanent museum of this character in the United States may be confidently predicted.

The Medical and Public Health Building, therefore, will provide a preview of what may be expected to be seen in the American Museum of Health, which has recently been incorporated. It has developed to the point of adequate description.

The subjects have been carefully chosen with their easy visualization in mind and they will be treated with such simplicity that they will be readily understandable to the public. The entire exhibit is being arranged and will be conducted under the supervision and guidance of professional committees of medical and public health experts.

There are three major divisions in the Medical and Public Health Building. They will tell with scientific accuracy, yet with life, color and motion, the story of:

1. What man is—his anthropology, his ethnology, his anatomy and physiology—this in the Hall of Man.
2. The diseases and health hazards which modern man encounters and how medical science attacks and conquers them—this in the Hall of Medical Science.
3. How public health practices prevent disease and protect and promote community health—this in the Hall of Public Health.

There is no place in the Medical and Public Health Building for commercialism. The scheme of financing is as dignified as the project itself. No space as such is available, only the sponsorship of educational and scientific exhibits is sold. Of the sponsors, some are commercial firms of the highest ethical standing, approved by the medical and public health professions. Others are non-commercial groups or individuals actuated only by motives of service to the public. Among those accepted for sponsorship of various exhibits are: New York City Cancer Committee, Cancer; John B. Pierce Foundation, Hygiene of Housing; Eli Lilly & Company, Diabetes, Blood Diseases and Anemias; Cherry Burrell Corporation, Milk Control; Lederle Laboratories, Allergy, Pneumonia, Children's Diseases; Winthrop Chemical Company, Analgesia and Anesthesia; West Disinfecting Company, Occupational Infections and Sanitation; Ciba Pharmaceutical Products, Heart Disease and Endocrinology; Maternity Center Association, Maternal Health; Dorr Company, Water Supply, Sewage Treatment, Waste Disposal; Mrs. Henry Ittleson & Associates, Mental Hygiene; Queensboro Tuberculosis & Health Association, Tuberculosis; American Social Hygiene Association, Venereal Diseases, Gonorrhea and Sex Education; Parke, Davis & Company, Syphilis; American Museum of Health, Inc., Professional Club; Rockefeller Foundation and Rockefeller Institute for Medical Research, Virus Diseases, Infection, and Immunity.

The readers of the *Journal* who carry the banner for public health progress in this country may well keep an eye on the Medical and Public Health Building at the New York World's Fair and thereafter on the first American Museum of Health and lend their aid to the extension of the inherent and underlying

motivation of the whole plan to the end that similar institutions may be established in their own communities for the ultimate objective to which we are all pledged—a healthy and a health-conscious people.

WADE HAMPTON FROST

ONE of the best minds that have adorned the field of public health during this century has passed from us in the untimely death of Wade Hampton Frost.

His promising work in the old Hygienic Laboratory of the Public Health Service, his demonstration of a capacity to link together the data from the field and the laboratory, led to his selection for many notable investigations. These included among others some of the early intensive investigations of typhoid fever, poliomyelitis, especially the 1916 epidemic, the large septic sore throat epidemic in Baltimore, the direction of the Ohio River Stream Pollution Studies, and the Statistical Studies of the Influenza Epidemic of 1918–1919. To each of these he brought the ability to plan for the data he required, their classification and digestion, and, finally, to draw whatever conclusions his logical and critical mind would permit. These latter would be expressed in clear, incisive English that admitted of no misunderstanding.

It was but natural that with these qualities, the Surgeon General should have been requested to assign him as Lecturer on Epidemiology when the new School of Public Health was established at Johns Hopkins in 1919, to become Professor of that subject two years later. As a teacher he was outstanding. From among his students and especially from among those who remained for a time as his assistants will emerge the leaders of public health of the next generation. Indeed, some have already developed. His influence on their habit of thought, in arousing a passion for research and discovery, whatever their field of activity might be, in the development of honest thought and self criticism, cannot help having laid a wide foundation upon which will be built a stronger, straighter public health program for the future.

It was natural that as public health problems multiplied he was sought more and more for his counsel in projected ventures, for his criticism of methods and results, for his advice as to further action. Wherever hard, honest thinking was wanted, " Jack " Frost *wanted* to go. He could not answer all the calls on his time but to whatever he undertook he gave without stint, without thought of reward or public credit. His only requirement was that the work he did should meet his own high standards.

In the American Public Health Association Dr. Frost was a leading figure. Besides having served as chairman of the Laboratory and the Epidemiology Sections of the Association, he was for many years a member of the Governing Council. His independent thinking was many times in evidence in relation to Association policies, and his critical examination of proposed actions will be missed more than many members appreciate. This year he was awarded the Sedgwick Medal for distinguished work in public health. It was never conferred on one more deserving.

From a personal standpoint the following editorial from the *Baltimore Sun*

of May 3 expresses with a beauty beyond the capacity of this writer, the thoughts of those who knew and loved him well:

"One of the fine and rare spirits passed from this earth on Sunday morning in the death of Dr. Wade Hampton Frost. He was a distinguished figure in medical science. To his work his associates will give tribute in due course. But, with all gratitude for his notable professional services, it is of the man himself that those who knew him well will think in the hour of his departure. What they will think will be this: Wherever he stood, there knighthood remained in flower.

"His personality had many facets. He had deep wisdom for the affairs of life, and he had subtle and penetrating wit. He had an austere sense of duty and a fine instinct for leisure. He could be the Spartan and he could be the bon vivant. No matter which facet he turned to life, it shone as in the sun. No one can recall the mean or malicious as his contribution in any relationship. All who knew him recall at this time the thoughts and the acts that were generous and just, high of mind and mood. He made living a noble adventure.

"Those who were privileged to have his friendship find their sorrow embedded in deep thankfulness for his life."

GEORGE MILLER STERNBERG

JUNE 8, 1938, will mark the 100th anniversary of the birth of George Miller Sternberg, President of this Association in 1887. He was born at Hartwick, N. Y. He was graduated in medicine from the College of Physicians and Surgeons, New York, in 1880. At the outbreak of the Civil War, he was commissioned Assistant Surgeon and served with credit through that great conflict. He distinguished himself for courage and repeatedly served his soldiers under fire. At the Battle of Bull Run he was captured by the Confederates, but escaped. It is said that he saw more active service on the battlefield in the Civil War and in the Indian campaigns that followed than any other medical officer of his time.

After the War he went West and experienced the terrible epidemic of cholera at Ft. Harker, Kans., in 1867, from which he lost his wife. In 1873 and 1875 he went through yellow fever outbreaks at Ft. Columbia, New York, New Orleans, and Barrancas, Fla., which unquestionably aroused the interest which he showed throughout his life in this disease, and led to the many studies he made personally as well as to his appointment of commissions to study it. While stationed at Walla Walla, Washington Territory, he began studies on the practical value of disinfectants, work which was subsequently continued in Washington and at Johns Hopkins. In 1885 he was awarded the "Lomb Prize" for his essay on disinfection which was translated into several foreign languages, and went through three editions, the last published in *Public Health Papers and Reports* (Transactions of the A.P.H.A.), Vol. XXV, 1899, p. 624. For many years it was the leading work on disinfection in the English language.

In 1891 he became Lieutenant-Colonel Surgeon and in 1893, Brigadier-General Surgeon General. Under his administration many important advances were made. He was responsible for the creation of the Army Medical School in 1893, which is regarded by some as America's first and oldest school of public health and preventive medicine. On his recommendation, Congress created the Army Nurse Corps and the Army Dental Corps in 1898.

General Sternberg may be called the pioneer bacteriologist of America, accomplishing good work under the most adverse circumstances and with poor equipment. In 1881 he discovered what is now known as the pneumococcus, very soon after the same discovery had been made by Pasteur. Neither suspected the connection of this organism with pneumonia and it remained for Fraenkel, Weichselbaum, and others to clear up the situation. General Sternberg always carried the organism in his sputum and in those days it was known as the organism of sputum septicemia.

There is no doubt that he saw phagocytosis which, however, had been observed by three or four others before him, two of whom, Panum and Roser, advanced fair theories of what it meant, but gave no experimental evidence, and it remained for Metchnikoff to formulate the theory and prove it by experimental work. His first paper was given at the Naturalists' Congress in Odessa in 1883, published in *Arb. a. d. Zool. Inst.*, Wien, 1883.

General Sternberg was a pioneer in photomicrography and some of his pictures remain unsurpassed to this day. While on duty at Fort Mason, Calif., he demonstrated and photographed for the first time in America the tubercle bacillus. In New Orleans, in 1880, he studied malaria and proved that the organism claimed by Klebs and Tomassi-Crudeli as the cause of the disease had nothing to do with it. He was a delegate to the International Sanitary Conference in Rome in 1885, and on his return, demonstrated for the first time in this country the plasmodium of Laveran in the laboratory of Dr. William H. Welch at Johns Hopkins.

His interest in the etiology of yellow fever has been mentioned. His search for the specific organism began in 1879. He twice visited Havana and also Rio de Janeiro, Vera Cruz, and Decatur, Ala., during the severe epidemic of 1888, in his studies. It is claimed by his admirers that he cleared the road for the work of the Walter Reed Commission. He was responsible for the appointment of the Commission headed by Walter Reed, which in 1900 cleared up the etiology of the disease and proved the agency of the Stegomyia mosquito, as it was then called, as the carrier.

His writings were voluminous and he gave to America the first comprehensive textbook on bacteriology. His bibliography includes 143 titles on bacteriology, disinfection, infectious diseases, and public health. He was President of the American Medical Association and of the American Public Health Association (1887), and held honorary degrees from the University of Michigan, 1894, and Brown University, 1897.

His later life was spent in Washington, D. C., where he died in 1915 at the age of 77 years. He is buried at Arlington and his monument bears the following epitaph, prepared by Dr. William H. Welch:

Pioneer American Bacteriologist. Distinguished by his studies of the causation and prevention of infectious diseases, by his discovery of the microörganism of pneumonia, and scientific investigations of yellow fever, which paved the way for the experimental demonstration of the mode of transmission of that pestilence. Veteran of three wars, brevetted for bravery in action in the Civil War and the Nez Perces War. Served as Surgeon General of the U. S. Army for a period of nine years, including the Spanish War. Founder of the Army Medical School. Scientist, author, and philanthropist. M.D., LL.D.

NOTE: We are indebted to the Editor of the *Annals of Medical History* for a manuscript prepared by Lt. Col. Edgar Erskine Hume, for assistance in the preparation of this sketch.

SOME PUBLIC HEALTH ASPECTS OF HOUSING

AN issue of the *Journal* which carries a third article on the housing activities of the Memphis Health Department may appropriately call attention to the recognition by housing officials of the contribution made by the public health profession to current housing programs.

The National Association of Housing Officials has referred to "the growing concern of the public health profession with housing conditions and programs of recent months" as "a most encouraging development," and has given effect to this appraisal by distributing the report of the American Public Health Association Committee on the Hygiene of Housing * to all local housing authorities. An equally cordial reception of the public health viewpoint in housing has been shown by the American Federation of Housing Authorities. A statement recently received from Miles R. Frisbie, Executive Director of that Federation, stresses the importance of basic health records in planning a local public housing program, including the necessity for legal powers in the health department for the demolition of insanitary dwellings, and the practical contributions from the health viewpoint to the proper design of new housing projects.

Both of these national housing organizations have recognized the contributions of health departments to local housing programs in cities such as Birmingham, Schenectady, Hartford, and Chicago. Both have paid special tribute to housing activities of the department in Memphis. In that city, housing betterment by the Health Department has ceased to be a negative matter of dealing with scattered sanitary violations and complaints, and has become a matter of constructive "municipal housekeeping" in accordance with a long-range plan.

* *A.J.P.H.*, Mar., 1938.

NEWER KNOWLEDGE OF POLIOMYELITIS

WE are publishing on another page an article on poliomyelitis, bringing the history up to date. It is remarkable to note that with increasing years of study, doubt is taking the place of much we have considered practically proved.

Almost coincidently is an unusually excellent article on the same subject,[1] which covers much of the same ground. We cannot do better than to quote the conclusions of this article, which in general are in entire agreement with those of the paper read at our annual meeting, and contained in this issue.

> It is evident that much of the recent work on poliomyelitis has been destructive rather than constructive in nature—perhaps a healthy sign. At any rate at the present time, we must face the fact that the prospects of solution of the many puzzling problems of this mysterious disease in the immediate future are not bright. Until such a time as the epidemiology is thoroughly understood and until a simple method of determining the susceptibility to the disease has been found and definite specific prophylactic and therapeutic means for combating the disease have been discovered, it would seem that the lay public is entitled to share with us the realization of our profound ignorance of most of the essential facts of the disease. The premature publication of half truths has for years kept the public in a state bordering on hysteria and has thrown a tremendous and increasing onus on the practising physician.

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PUBLIC HEALTH EDUCATION*

They Aim to Please in Delaware—To please and thus to attract and to hold attention, as told by L. C. Messick, director, public health education, Delaware Board of Health, Dover:

The Division of Public Health Education is conducted with the belief that explanation of a project wins understanding allies and multiplies public coöperation with health programs. With this in view, informative releases are sent the newspapers, pamphlets offered to the public, a free quarterly magazine published, talks arranged before pertinent groups, motion pictures and illustrated sound lectures projected before service clubs, granges, P.T.A.s and similar gatherings.

The informative newspaper releases serve as the back-log of the program, tying together the other activities through furthering each and through consistently keeping the reading public acquainted with the work, plans, and accomplishments of the State Board of Health. It has been conservatively estimated that the weekly newspapers use an average of 88.5 per cent of the material sent them, and that the daily papers use 75 per cent.

To carry on this program of newspaper information, regular visits are made to the heads of the various sub-divisions of the State Board of Health, to seek out any newsworthy subjects in their work. When they have any specific plans, drives or projects in need of public attention, detailed programs of suitable publicity are prepared and submitted to them for approval, before being carried into effect. Occasional visits to newspaper editors aid in maintaining their interest and coöperation.

The *Delaware Health News*, published quarterly, is prepared with the belief that it must compete, in homes and offices, with news, fiction, and humor magazines of national distribution. As a result, the format has been entirely modernized, an extra color used wherever appropriate (and in so far as budgets allow), emphasis given to designing effective front and rear covers, and considerable attention devoted to creating interesting page layouts. The mailing list includes all Delaware physicians, school teachers, ministers, members of the legislature, newspaper and magazine editors, and any others who request that their names be included.

Health exhibits are designed and installed at suitable gatherings, conventions and fairs. Each is so constructed as to make it readily portable and adaptable to almost any display position. In designing exhibits, smart colors, bright lights, and modernistic designs are used to alleviate any atmosphere of gloom and foreboding, and better to attract and hold attention.

Pamphlets and folders on various health subjects are designed for smart appearance, ready reference, and convenient preservation by the public. Pleasing designs and colors are utilized to draw attention, and all publications pertinent to the same subject are prepared on paper of the same color. Internal text arrangements are designed to facilitate rapid reading and ready reference. Included are pamphlets on the various diseases—diphtheria, syphilis, gonorrhea, tuberculosis, diarrhea and enteritis, diseases of children, typhoid fever—and precautions to prevent their contraction or further spread; pamphlets on the selection of menus with regard to economy and nutrition; pamphlets on the care of the teeth; pamphlets on mother and child care and feeding; pamphlets on home, farm, and swimming pool sanitation, and others.

Where suitable, and upon original publication, these booklets and pamphlets are distributed to a part or all of the mailing list; clinics, health centers and libraries are kept supplied with them thereafter, for placing in "free distribution" racks.

Briefly, this section of the State Board of Health endeavors to gain public coöperation and forestall criticism by explaining the motives of the other divisions of the board, and by educating the public in the wisdom of their plans.

* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Evart G. Routzahn, 130 East 22d St., New York, N. Y.

Social Hygiene Racketeering — "Hangers on the Social Hygiene Bandwagon" are described in *Bulletin*, Massachusetts Society for Social Hygiene, Little Bldg., Boston, Mass. Jan., 1938.

The widespread publicity concerning the present campaign to stamp out syphilis has called forth an increasing number of scheming promoters who wish to cash in on the national anti-syphilis program and who are setting up here and there "social hygiene organizations" for which they are soliciting funds. We have no quarrel with those whose sincere interest in the subject moves them to set to work and to utilize straightforward, approved and scientific methods in their work. . . .

It must be admitted, however, that there are many men who with an eye to the main chance will climb on any bandwagon provided it is steadily going somewhere and proceed to gather in the shekels for themselves. It is against individuals of that ilk that this warning is directed. The recipient of any appeal for money to help in the campaign to stamp out syphilis will do well to investigate the source of the appeal. . . .

Then is quoted the *Journal of A.M.A.*:

At this time, any new organization in the field of social hygiene should be scrutinized with care, to make sure not only that it is free from racketeering possibilities but also that it has sponsorship which gives reasonable assurance that funds entrusted to it will be expended wisely and in the public interest.

The Health Department Library —We give below a picture of the New York City Department of Health Library. Not many cities will have a real, trained librarian, but the atmosphere and the range of resources may well be duplicated in numerous cities. *What are the characteristics of a desirable, helpful department library? What other characteristics have been noted by the traveling representatives of state or national health agencies?*

This Job of Ours describes the New York City Library:

A library in charge of expert librarians is an advantage very few health departments enjoy. Our library, located in commodious quarters on the second floor, is a branch of New York's Municipal Library. You are welcome to use the library whenever you need it. If you want help in looking up particular subjects, you will find it generously offered. All employees are entitled to the privilege of using the library.

On the shelves are many treasures not easily found elsewhere. Practically all the standard books on public health are there, besides complete reports of the department since its organization in 1867. Among the authors represented are a number of our own, past and present, health department staff members.

Seventy-five periodicals, including 7 from foreign countries, are regularly received. After circulation among staff members who wish to see them in their offices, they are placed on file. Comfortable chairs and pleasing surroundings add to the pleasure of browsing or spending a noon hour there or doing research reading. Books and periodicals may be taken home by arrangement with the librarian.

A new service the library soon hopes to inaugurate is that of supplying recent reprints and pamphlets on subjects of current interest, such as—pneumonia, syphilis, child hygiene, and so on. Selected publications will be collected and kept in stout envelopes according to subject. These "Package Libraries" will be mailed to employees who ask for them on a loan basis. The packages will be kept up-to-date. If this service proves popular, we hope to expand it.

County Nurse Hits the Bull's Eye — County Nurse Gertrude M. Clouse tells about "Publicity in Public Health Nursing" in *State Board of Health Bulletin*, Madison, Wis. Oct.-Dec., 1937.

Miss Clouse has the big idea for effective newspaper publicity (our italics):

The public is so many times swayed by propaganda. Why, then, shouldn't one get the right propaganda before them? That was the way I felt about my newspaper publicity. I wanted so much to get the people public health minded.

Consequently each of my articles was current in subject matter and grew out of a

dire necessity to *get that topic before the public at a time when their interest in that topic would be keenest and would do the greatest good.*

Do You Know What to Believe?—Or, do you know what is propaganda, and what is not? Don't ask us what is propaganda, or why we should be able to recognize it. Those two questions must be answered another day.

However, many of our readers and others believe that propaganda is responsible for many questions to be studied with care. And public health educators need to learn how *their* propaganda stacks up with the propaganda from other sources far too numerous even to list.

The Institute for Propaganda Analysis (132 Morningside Drive, New York, N. Y.) has been formed to "help the intelligent citizen detect and analyze propaganda. The Institute

. . . is a non-profit corporation organized for scientific research in methods used by propagandists in influencing public opinion. It will conduct a continuous survey and analysis of propagandas. By objective and scientific scrutiny of the agencies, technics, and devices utilized in the formation of public opinion, it will seek to show how to recognize propaganda and appraise it.

The Institute issues a *Monthly Letter* for those who

. . . desire periodic, objective appraisals of today's propagandas, their sources and the channels through which they flow: newspapers, magazines, radio stations, motion pictures, labor and business groups, patriotic societies, farm organizations, schools, churches, political parties.

The board of directors is made up of university and college professors, including names known to all of us, and two or three others. Some readers will wish that they had broadened the base of responsibility for the project.

Membership is $2.00 a year, to start Oct., 1937, or later, as one may desire. At least write for information and samples. If you are interested in propaganda in schools they will tell you about special plans and materials.

Basic to Success Against Cancer—"Educational Methods and Cancer." *Bulletin,* American Society for Control of Cancer, 1250 6th Ave., New York, N. Y. Nov., 1937. Develops the following points:

"The first point to bear in mind is the *mental attitude* of the person to be educated . . . Second among the important principles of cancer education is the *complex nature of the process of diagnosis and treatment* . . . A third important point to be remembered is the *nature and degree of complexity of the information to be transferred* . . . Finally comes the question of the *duration of education effort . . . The enlistment of hundreds of thousands of individuals who are known, organized, directed and continually aroused is the only way.* The control of cancer requires the establishment and maintenance of a *point of view which must become an integral part of the daily lives of those who would survive.*"

A Comprehensive State Health Education Program—Later in the season we hope to present the plan in detail. This month we quote from the introductory statements in "Kentucky's Plan for Public Health Education," by Dr. A. T. McCormack and Reba F. Harris, in *Public Health Reports.* Oct. 29, 1937. *5 cents.* Supt. of Documents, Washington, D. C.

Since approximately 70 per cent of all public health work has its basis in education, it becomes imperative that more time and thought be given to a well organized plan of public health education. Social Security funds have enabled the Kentucky State Department of Health to set up such a functioning plan.

This plan is based on the point of view that public health is concerned not only with saving lives of human beings, but also with guiding them to learn how to live healthfully and effectively in their daily environments. This guidance becomes more effective with the understanding of the facts that specific health problems arise within certain age

groupings, and that health hazards exist under certain environmental conditions. . . .

Kentucky's new plan of public health education, therefore, is based not upon artificial publicity devices, but upon a better understanding of the health needs of human beings in the various age groupings as they react to each other within the respective environments in which they live. This will be recognized as the ecological approach to public health education.

The first step toward the application of this approach is an efficient corps of public health workers who render all services in an educative way; for, whether it be through emotional appeal or reasoning, the activity or procedure in itself provides the greatest possibility for catching the attention and thereby places the individual or group in a receptive frame of mind for the operation of the learning processes. In other words, a community of both adults and children will understand more readily the values of a safe milk supply if facts concerning its own present supply, and the inherent dangers, are presented for study and discussion at the time the community leaders are planning changes or improvements in such supply. . . .

That the activities and procedures involved in the generalized program of public health in Kentucky may become forces for education in the lives of her people, the Kentucky plan for public health education, coöperatively formulated by all members of the State Department of Health staff, begins with the continued learning, or in-service education, by the two major groups of people who are actively engaged in public health work: namely, (1) The administrative and staff members of the State Department of Health, and (2) personnel of the coöperating county and city health departments.

Through these two major coördinated groups, the plan extends to the leaders of the organized forces for social betterment and to the public in general within the state and local communities; for it is that group of workers—public health physicians, public health nurses, and sanitary instructors—who are charged with the responsibility of bringing to a greater number of leaders in all phases of social betterment—health, welfare, education, religion, social economics, as well as farm and labor organizations, women's clubs, and bar associations—a better understanding of the values of public health protection.

Then follows "The Functioning Plan" based upon 3 committees and the detailed plans for their direction: Committee on Continued Learning by State Staffs . . . Committee on Continued Learning by County Unit Personnel . . . Committee on Continued Learning by the Allied Groups.

We have requested a progress report on the first 12 months of experimental work under this plan, to be published in an early summer issue, along with the full outline of the plan.

When You Come to New York—You will, of course, find most of the national health agencies at 50 W. 50th St., in Rockefeller Center.

Right in the same building is the Museum of Science and Industry, a "must" on the calendar of any one interested in the exhibit form of presentation.

Incidentally, the one best aid to the visitor in Manhattan is the weekly *Cue* (6 E. 39th St.) to be found on news-stands. This will give the maximum of dependable information about plays, pictures, music, dining, and other recreation features.

What Life Did—Says an editorial in *Editor And Publisher*, journal of the newspaper world (April 9, 1938):

A bit ahead of the procession may be *Life* magazine in its picture sequence, published April 11, depicting the birth of a baby. The motion picture upon which the feature is based has run into the opposition of Mrs. Grundy in several cities, and *Life* undertakes more than the normal publishing risk in devoting its central four pages to the story.

Both the film and the *Life* sequence are done with the utmost delicacy, but with the complete eradication of the stork and cabbage leaf fables that used to be fed to the youth of the land. No youngster who gets hold of this copy of *Life* will ever be in any uncertainty as to how he arrived in society, and the way is laid open for diffident parents to reveal what the magazine omits.

Recognition of the dynamite that still inheres in any public treatment of the mystery of generation is seen in *Life's* letter to its 650,000 subscribers. It explains the feature, quotes endorsements from numerous educators, physicians, and editors, and points out

that the four centre pages can easily be removed from the issue if parents don't want their children to learn the facts of life that way.

For our part, and from considerable experience as a parent, we can point to no better channel of education than pictures selected by an editor with a sense of decency, balance, and intelligence. These qualities have not always been evident in picture magazine treatment of similar subjects, some of which have been called to our attention as a father and not as an editor. The temptation to the low-minded is always to tickle the itchy-minded reader, and while you can get circulation that way, you also invite censorship. *Life's* job may not win any new circulation, but it ought not to lose any—and it is certainly no bid for the exercise of blue pencils.

SAFETY

"Death Begins at 40" is the 1938 issue of the highly original annuals issued by Travelers Insurance Co., Hartford, Conn. There are 40 pages of striking text and illustrations against death by careless drivers. The pamphlet is offered for free distribution, and the facts and illustrations may be reprinted. We hope to see some of the material reprinted in many health bulletins. Suggestion: Your reproduction will be more effective if you don't try to copy the red initial letters and the confused typography of some of the pages.

"1938 Accident Facts: Preliminary Edition" contains a wide range of accident facts and figures for 1937. The final and complete edition will be issued in June. In the meantime the "Preliminary" will be supplied by National Safety Council, 20 N. Wacker Drive, Chicago, Ill. *Free.*

"A Matter of Life and Death," by I. A. Booker. *Journal,* N.E.A., 1201 16th St., N.W., Washington, D. C. Oct., 1937. *25 cents.* Safety in education; source material.

"The Nurse Stimulates Employee Interest in Safety," by E. Augustus. *Public Health Nursing,* 50 W. 50th St., New York, N. Y. (date?)

"The Prevention of Home Accidents," J. Melpolder. Includes popular education and group discussion. *Public Health Nursing,* 50 W. 50th St., New York, N. Y. Feb., 1938. *35 cents.*

"Safety Education" is a section of "A Guide to the Teaching of Health in the Elementary School." University of State of New York, Albany. Teaching materials; children's activities; references for teachers and for children; sources of inexpensive and free safety materials.

"A Short Story of Organized Recess" describes a plan for securing a safe recess for school children. *Safety Education,* 1 Park Ave., New York, N. Y. Feb., 1938. *10 cents.*

"Two Thousand Infants Killed Annually in Accidents." *Statistical Bulletin,* Metropolitan Life Insurance Co., New York, N. Y. Oct., 1937.

BOOKS AND REPORTS

Approved Laboratory Technic—*By John Kolmer and Fred Boener (2nd ed.). New York: Appleton-Century,* 1938. 893 pp. Price, $8.00.

It is apparent that the original purpose of the manual, to standardize various laboratory examinations and to make clinical pathology increasingly applicable in the diagnosis of disease, is well maintained. The book is the result of the work of 28 collaborators who are the originators of methods themselves.

The manual covers the extensive and ever-widening field of clinical laboratory methods in a clear, complete, accurate, and concise manner. The book has been revised, and enlarged with the addition of many new methods in keeping with the rapid advance of work in this field. References are given for those who are interested in doing further study and collateral reading. Five new chapters have been added: (1) On the methods for hormonal diagnosis of early pregnancy, hydatiform mole, chorion-epithelioma and taratoma of the testicle. Although brief, it covers the essential steps in the laboratory diagnosis of these conditions. Six references are given to original papers. (2) On the laboratory diagnosis of disease produced by yeasts and fungi. This serves as an aid in the usually difficult diagnosis of mycological diseases. Numerous illustrations are included. (3) On the diagnosis of parasites producing disease of the skin and mucous membranes supplemented with illustrations. (4) On methods for conducting tests for allergy. Methods are given for the preparation of allergens and the technic of various skin tests. The technic of the Frei test and the preparation of the antigen is given. (5) On histological methods and the preparation of museum specimens. This contains much easily readable and useful information on the organization and operation of a laboratory for the microscopic diagnosis of tissues. Many special staining methods are given.

The text is well indexed.

W. D. STOVALL

Experimental Studies of Water Purification—*By H. W. Streeter, Frederick J. Moss, C. T. Wright. Reprints Nos.* 1114, 1170, 1392, 1434, 1565 *from Public Health Reports. Washington: U. S. Government Printing Office,* 1938. 96 pp. Price, $.25.

Brief Abstract—The six reports included within this binding deal with a series of experimental studies of modern water purification methods which were made over a period of about 6 years in 1924–1929 at the Stream Pollution Investigations Station of the U. S. Public Health Service at Cincinnati, utilizing a large-scale experimental water filtration plant.

The first report contains a description of the experimental plant. The second and third reports deal with results of the first 15 months of operation and with certain relationships between the quality of influent and effluent studied in this connection. In the fourth and fifth reports, results are given of observations on the efficiencies of purification obtained with certain modifications in rapid-sand filtration treatment, such as pH adjustment, increased coagulant dosage, prolonged sedimentation and prechlorination, involving no material changes in the design or construction of existing plants of

the same type. In the sixth and concluding report, the results of the experimental studies are summarized and compared with those of two field surveys of 31 municipal water purification plants, reported in *Public Health Bulletins 172* and *193*.

Two by-products of the studies have been (1) the establishment of a fundamental relationship between the densities of pollution of influent and effluent waters governing all water purification processes observed, and (2) the derivation of some new data bearing on the practical efficiency of various processes of purification and the extent to which this efficiency may be modified by certain physical conditions, some controllable and others non-controllable by the plant operator. The influent-effluent relationships established may be applied to determining limiting degrees of raw water pollution consistent with the production of effluents of any desired quality.

H. W. STREETER

Report of Investigations of the Typhoid Fever Epidemic, Minneapolis, 1935—*By the Minnesota Department of Health*, Minneapolis, Minn., 1938.

In 1935 there was an epidemic of typhoid fever in Minneapolis, Minn., covering 98 days, beginning the first half of May and running until the early part of August. During this time there were more cases of typhoid (175) than had been reported for the previous 6 years.

The *Report of Investigations* has just come to hand. It is well done, thorough, and carries also research work on the comparative resistance of different strains of typhoid and other intestinal bacteria to varying amounts of residual chlorine.

The report is divided into three parts, the first of which gives the epidemiological studies and conclusions as to the source of the epidemic, the second covers the investigation of the Minneapolis water supply, and the third the research studies mentioned.

The conclusion is reached that of the persons who suffered from typhoid fever, 159 had used water from the Fridley zone in the home, at work, or elsewhere, and that 15 more had used water from the "mixed" zone carrying in part water from the Fridley plant.

In the latter respect this epidemic is not unlike the one which recently visited Croydon, England, in which an otherwise good water supply was infected by one well on which construction work was being done.

The report is well documented and contains a wealth of charts, maps, and figures. Altogether it strikes us as being a very valuable investigation, and unusually well done. It will be of interest chiefly to health officers and to water engineers.

MAZŸCK P. RAVENEL

Report on Eighth International Congress of Military Medicine and Pharmacy—*By Captain William Seaman Bainbridge, M.C.-F., U.S.N.R., Ret., Department of State. Washington, D. C.: Government Printing Office*, 1937. 114 pp. Price, $1.00.

The Eighth International Congress of Military Medicine and Pharmacy met in Brussels, Belgium, June 27–July 3, 1935. The first Congress met in Brussels in 1921, and subsequent meetings were held each second year in Rome, Paris, Warsaw, London, The Hague, Madrid, and Brussels. The Eighth Congress was attended by 10 delegates from the United States of America under the chairmanship of Major Robert U. Patterson, formerly Surgeon General of the United States Army, representing the Army, the Navy, and the U. S. Public Health Service. In all, 39 countries were represented by official delegations composed, in most instances, of medical

officers from the Army and Navy of the respective countries. All the major powers were represented at the Congress.

The *Report* of the Congress deals, for the most part, with certain subjects which were officially reported upon in accordance with the agenda of the Congress. These subjects are:

I. Principles of organization and functioning of medical services in mountain warfare
II. Determination of fitness for the different specialties in armies, navies and air forces
III. The post-traumatic abdomen
IV. A study of the standardization of methods of analysis of foodstuffs for military use
V. Bucco-dental service at the front
VI. Comparative study of the functions of the administrative medical services of armies, navies and air forces

The report as written comprises 111 pages of text. Generally, the material presented is of a highly practical nature and the conclusions reached are those based upon the experience of various medical officers serving in the different armies of the world. The report is of such a nature that it cannot be adequately summarized here, but it should be read by all those interested in military medicine.

G. C. DUNHAM

How To Be a Convincing Talker—*By J. George Frederick. New York: Business Bourse,* 1937. 2 vols., 131 pp. Price, $3.50.

Here we may learn much about talk as a tool—how to get along with people in talk, and how to talk them into doing what we want them to do. There are hundreds of books on public speaking, debate, and related topics. I am not prepared to compare this book with others more or less in the same field, but here we have easy to read working ideas, with numerous illustrative examples, which seem to be usable by many *Journal* readers. It is about talking, about public speaking, and about listening, too. The application of what is said under "Fallacies about Speeches" and "Care and Responsibility with Speech Material" would change many a convention and meeting program. It is a book to be examined before passing it up. In all of the professions there is increasing recognition of the importance of talk and of public speaking. EVART G. ROUTZAHN

Latent Syphilis and the Autonomic Nervous System—*By Griffith Evans (2nd ed.). Baltimore: Wood,* 1937. 158 pp., 50 plates. Price, $3.00.

Noting that the accepted modes of diagnosing syphilis—demonstration of the spirochete, serological tests, and pathognomonic lesions—are not wholly applicable to the diagnosis of latent syphilis, the author pleads for a more detailed analysis of family history and for more frequent recourse to the therapeutic test as supplementary criteria for diagnosis. He then levels suspicion at a train of syndromes attributed to autonomic dysfunction.

Starting from the observation that secondary syphilis entails a generalized lymphadenitis and that the autonomic nerves bear an intimate relationship to the paravertebral lymph chain, the author considers that a definite proportion of diseases of the thyroid, asthma, angioneurotic edema, purpura blanching of extremities, congestion of extremities, and claudication result from syphilis.

The author has not been very critical in his choice from the literature of evidence supporting his hypothesis. He accepts as proven the theory that the spirochete has a granular form and that infection may be congenital in the third generation.

The book will be read with some skepticism by those who have been trained to "deplore a facile assumption of a diagnosis of syphilis." Its chief

merit is that it raises the present rather low level of suspicion with regard to latent syphilis, even though it fails to convince the reader that the suspicion is directed along the proper channels.

RALPH E. WHEELER

Integration, Its Meaning and Application — *By L. Thomas Hopkins and Others. New York: Appleton-Century,* 1937. 315 pp. Price, $2.00.

This volume represents an exploration of the subject of integration by a committee composed of leaders in the fields of art, biology, philosophy, psychiatry, psychology, and sociology. The first 9 chapters deal with the principles and ideas of integration, while the remaining 5 chapters describe and evaluate practices under various types of school curricula.

Integration is described as a shorthand word used to designate intelligent behavior, the process of integrating referring to continuous, intelligent, interactive adjusting. In the biological field, study of human integration indicates that the human body is the physical stuff from which all of human activities are derived. From the psychological and psychiatric clinic evidence is suggested to show that the personality is so closely bound up together that events which may seem to be far apart in time and quality may nevertheless unite in bringing about a given action. Furthermore, the interaction with society, integration within a culture of an individual influences human characteristics.

Basic conditions are outlined which must be borne in mind in planning a program of education designed to promote the maximum integrating behavior of normal individuals or in reëducating those who are now abnormal. Recently, it is noted, the movement in course of study construction has been away from the subject-curriculum type toward the experience-curriculum type. Since courses of study affect the experience of pupils and teachers in the classrooms and in life outside the school, the belief is expressed that "These changes must be aiding them to achieve more integrating behavior in all of their interactions with their environment." This book is an interesting reference volume for those engaged in health education.

IRA V. HISCOCK

How To Use Pictorial Statistics —*By Rudolph Modley. New York: Harper,* 1937. 186 pp., ill. Price, $3.00.

This is a readable book—the result of the writing, the large type on an open page, and the numerous reproductions of examples. The author, a former student of Dr. Neurath, is executive director of Pictorial Statistics, Inc., 142 Lexington Ave., New York, N. Y.

We have had enough bad examples of pictorial statistics to make it important that this book be read by anyone who starts to use the method. No technic can be "learned from a book" without trial and error. But this book should reduce the "error" element.

Happily, the National Tuberculosis Association and a few other groups are making it possible to have in this country fresh examples of the work of Dr. Neurath. However, it cannot be that no others may become practitioners in pictorial presentation, nor that all practitioners should subscribe to the inflexible form laid out by Dr. Neurath. Says Mr. Modley:

> Any book which attempts to deal with the method of pictographs must acknowledge its indebtedness to the genius of Otto Neurath. He more than any one man created that method and made it into a significant tool of communication. This makes it more regrettable that Dr. Neurath has not found it possible to follow what seems to me the inevitable trend in the development of pictographs. I hope that the success of our American experiments will convince him that the restrictions he has set up are not fundamental implications of the method.

The crux of our difference of approach lies in our different interpretation of the character of the symbols. Dr. Neurath holds firmly to the belief that pictorial symbols should be international, designed within rigid limitations so that a pictorial Esperanto will be created. He wishes to circumvent a pictorial Tower of Babel and produce at once an international picture language. With that ultimate aim I heartily agree, but I believe his method of achieving it is Utopian.

I believe that pictographs must gradually be accepted as a tool of communication. To achieve this, the symbols must first grope their way into the consciousness of a restricted national audience. They must speak in terms which are comprehensible. Obviously, such symbols must be prepared with their specific audience in mind.

The American and the Chinese farmer dress differently and use different tools; the symbol for "farmer" in America will, therefore, vary from the symbol of "farmer" in China. When national schools will have developed to a point at which they are generally accepted in their countries, then the time will have come to combine the best features of each to create an international picture language.

The book also brings out experimental adaptations of the pictorial method in other directions than the diagram of comparisons: the expression of ideas, the illustration of processes or procedures. Then the use of pictorial material in exhibitions, and in museums receives attention.

Not all of the work of Dr. Neurath or of Mr. Modley is unquestioned. Probably both would more often reach 100 per cent if their tentative layouts were tested on a few people outside their own organizations. Particularly are they liable to add a touch of confusion through the addition of what is likely to seem to be ornament, but which is intended to be explanatory.

"The explanatory pictures serve only to indicate the field to which the symbols apply, or to explain some of the qualifications."

The weakness is that they may neither indicate nor explain. A symbol is not a symbol to another mind until its significance becomes clear. Simple English words are better than a symbol which slows down the understanding of what follows.

Anyway, we owe much to Dr. Neurath, with his pioneering persistence and his fine sense of color and design, and to Mr. Modley for his effective job of Americanization.

EVART G. ROUTZAHN

Report on the British Health Services—*By Health Group of PEP. London: PEP, 16 Queen Anne's Gate,* 1937. Price, $3.00.

This is a notable book primarily because it represents Great Britain's first attempt to present a comprehensive picture of her health services together with her contemporary problems. In a general manner the organization and functioning of health services is examined and occasional proposals are made for future development of health services. As a rule, however, proposals for future development are vague and indefinite, reflecting perhaps the influence of anonymity with which PEP work is conducted.

No doubt much detailed precise information was used in compiling the report and in arriving at general principles which should govern future improvements. It seems to the reviewer unfortunate, however, that so little precise data were incorporated. Perhaps the material available to those preparing the report accounts for this, as many of the tables presented are not clear. The report points out that prevention of much unfitness can come from a study of social and economic factors, but seemingly fails to appreciate that a study of administrative machinery and of organization can contribute very distinctly to the production of health by bringing about a more effective utilization of health facilities. Only 5 pages are given to a description of the complex administrative machinery surrounding British health services. Resources of

personnel and of money are likewise very incompletely pictured.

First consideration is given to provisions for impersonal protective services and regulation of the environment. Overcrowding and slum conditions have led to State-assisted building programs for elimination of the worst slums. Decentralization of industry is considered one of the most essential moves to offset many of the factors favoring overcrowding and unhealthy environmental conditions. Sanitary facilities—water, sewerage, and scavenger services—are generally adequate in most urban areas but often inflated in costs by the division of suitable areas into several jurisdictions which are not inclined to act as one administrative unit.

Comparatively little development has taken place for the improvement of working conditions in industry. Regulations are often lacking and standards of safety and health if present are very low, with the result that a heavy burden of sickness and accidents occurs. PEP does not offer any concrete proposals which would modify this situation appreciably. Administratively the regulation of industrial health is largely divorced from general health administration.

Trade in food and drugs is for the most part uncontrolled. Laws pertaining to food are administered by local authorities with varying degrees of zeal. Milk-borne epidemics are not infrequent and much control is needed over food composition and quality. A more serious matter is the unrestricted advertising of health foods and drugs, whereby the consumer's health is exploited with exaggerated, misleading, and false claims.

The section on infectious diseases points out that vaccination against smallpox has been compulsory for 60 years but because of loopholes in the law little more than a third of the children are protected. The situation with reference to diphtheria is so appalling that one cannot avoid questioning the accuracy of the figures presented. According to one of the tables, in 1933 and 1934 there were 59 diphtheria deaths per 1,000 boys, ages 2–5, and 55 diphtheria deaths per 1,000 girls, ages 2–5. It is stated that diphtheria immunization has not found general adoption, and its value is still questioned by some of the profession in Scotland.

Death rates during the first week of life and during the maternity cycle have shown the same resistance to decline found in the United States. Maternal mortality rates are consistently lower in England and Wales, where midwifery is frequently practised, than in Scotland where a greater proportion of births are delivered by physicians. From 5 to about 40 per cent of births occur in hospitals. In addition to the usual provision of clinic centers and health visitors for mothers and children, day nursery schools are operated by a few local authorities. Cash benefits are given mothers who are insured or whose husbands are insured in the National Health Insurance scheme. School health programs are administered by local educational authorities. The nutrition of the working classes, and particularly of mothers and children, constitutes a major health problem since the dietary is quite unsatisfactory. One chapter alone is devoted to nutritional aspects of health and to measures for improving nutritional status. Several concrete proposals are made, one of which is a subsidy to lower the prices of essential foods to make them available to those unable to afford a proper diet. Emphasis is given to the need for a marked expansion of the consumption of liquid milk. To a large extent the nutritional problem has its origin in low income but much of it arises from ignorance of food value on the part of the consumer.

A large section of the report deals with the medical profession and its ancillary workers, with National Health Insurance, hospital and institutional facilities, and special services.

One of the main problems of medical care is to improve the quality of general practitioner services and to extend them to an overwhelming majority of the population. An increasing tendency of patients to choose specialists in preference to general practitioners is ascribed to the poor quality of care frequently given by the latter class of doctor. It is recognized that the general practitioner's decline and the resort of unadvised persons to specialists is symptomatic of the inability of doctors practising general medicine as separate units to meet the standard of care dictated by modern medical needs. Even so, PEP proposals give little reason to expect the situation to improve. Institutional and hospital services are handicapped by overcrowding and inadequacy of organization and equipment. Some correction of this condition it is thought should accompany a strengthening of the position of the family physician who should be able to prevent unnecessary resort to hospitals and to reduce the need for institutional provision. How this strengthening is to be brought about is obscure but presumably is related to opportunities for refreshing the practitioner's knowledge. Refresher courses are arranged by a number of schools and by some divisions of the British Medical Association. Recently the Minister of Health has made plans for refresher courses to insurance practitioners by money grants. Five years must have elapsed since registration and a minimum number of insured patients must be on the practitioner's lists in order to be eligible for a grant. In this connection it appears that the need for refreshing the knowledge of public health personnel has been overlooked.

The shortcomings of National Health Insurance and the arguments against this scheme are discussed. An important defect will be remedied by an expansion to cover dependent family members of insured persons and inclusion of services of specialists. Administration costs constitute an important disadvantage of the insurance principle. In addition there is the objection that a proper overhauling and combining of all medical services is hindered by the scheme. A public medical service organized along with all public health activities supported from general taxes offers lower administrative costs and a more effective service. In spite of this, however, an extension of the health insurance is recommended.

The report, written largely from the authoritative viewpoint in which statements unsupported by quantitative evidence are frequently made, contains nevertheless useful information for the student interested in obtaining a cursory description of the interplay of British services.

PEP will dispel any doubt in the minds of those who feel that conditions of general well-being in the United States are unfavorable in comparison with those of Great Britain. Apparently the British attitude is to "hit upon" rather than to develop measures fostering health. The reviewer cannot escape the feeling that despite Great Britain's more comprehensive statutory provisions for the relief or prevention of ill health, she lags far behind the United States, largely because there has been lacking a dynamic attitude permitting necessary changes to be effected in the social machinery for the better adjustment of forces producing health.

J. O. DEAN

Third Symposium on Silicosis (Saranac Lake)—*Edited by B. E. Kuechle. Wausau, Wis.: Employers'*

Mutual Liability Insurance Co., 1937. 266 pp., paper. Price, $3.00.

The papers and discussions in connection with this symposium, held at Saranac Lake, N. Y., June 21–25, 1937, are edited, as in the case of the two previous reports, by B. E. Kuechle.

The report comprises the following: Introductory remarks and the significance of the silicotic problem, by Dr. L. U. Gardner (3 pages); etiology of silicosis, by Dr. R. R. Sayers (2 pages), and by Dr. Sayers and Dr. R. R. Jones (19 pages with bibliography); dust concentrations and their measurement, by Prof. Philip Drinker (8 pages); pathology of the pneumoconioses, by Dr. L. U. Gardner (48 pages); physiology of the fibrotic lung, by Prof. W. S. McCann (13 pages); roentgenologic aspects of the normal and silicotic lung, by Dr. E. P. Pendergrass (14 pages); roentgenologic diagnosis of silicosis, by Dr. H. L. Sampson (20 pages); the clinical picture and diagnosis of silicosis with consideration of disability, by Dr. A. R. Riddell (10 pages); control—medical aspects, by Dr. A. R. Riddell (9 pages); control—engineering aspects, by Prof. Philip Drinker (7 pages); administrative aspects of silicosis, by D. E. Cummings (10 pages); and legislative control and compensation, by T. C. Waters (17 pages). Several pages of discussions follow each paper as a rule. A table of contents, a few illustrations, tables and charts, and a brief index complete the volume.

The wide reputation of the various contributors as specialists in their respective fields speaks for the high character of the context, which with careful editing of the discussions renders the volume indispensable to a large group now interested in the pneumoconioses.

As these succeeding annual symposia reports appear it may be seen that American experience is rapidly accumulating on this important subject, while general agreement on many features is gradually assuming form; yet there are still many problems to be solved, which will come as the result of continued observations and critical studies, particularly upon the chemical, physiopathological, and infectious nature of the various lung-dust-diseases, and a protracted observation of the progress of cases and methods used to control and prevent them.

There is no doubt a correct feeling among Americans that the question of silicosis and other lung-dust-diseases should be worked out in connection with the characteristics of our own industries and employment methods, since much of the experience from abroad pertains to special conditions such as those occurring in the deep gold mines of South Africa, which do not exist with us. Fortunately many institutions, industries, and individuals are now hard at work upon the problem in the United States and in Canada.

EMERY R. HAYHURST

The Rat and Ratproof Construction of Buildings—*By B. E. Holsendorf. Supplement No.* 131, *Public Health Reports. Washington, D. C.: U. S. Public Health Service,* 1937. 68 pp. Price, $.15.

This publication of the Public Health Service designates the rat as "Public Enemy No. 1" among animal pests. The rat, probably equaling in number the human population, destroys property of many kinds, and runs up an individual board bill of about $2 annually. It bears directly upon public health as the agent disseminating bubonic plague and typhus fever and probably is a factor in transmitting trichina to hogs. The presence of a large rat population is a challenge to the health official but a problem which has not been solved, largely because the public lacks understanding, interest, and willingness to coöperate.

This report summarizes the factors

involved in rat control, discusses the elimination of harborage by proper ratproofing of buildings and other structures, and reviews suppression by other measures. In an excellent series of plates, the structural details of ratproofing are illustrated, together with composite drawings showing how fundamental ratproofing can be accomplished by proper design. A proposed model ordinance requiring the ratproofing of buildings is included as an appendix.

Everyone interested in the rat problem and particularly health and building officials will find this publication a valuable source of information.

J. L. BARRON

Principles and Practice of Bacteriology—*By Arthur H. Bryan, M.A., V.M.D., and Charles Bryan, M.D. New York: Barnes & Noble,* 1938. 267 pp. Price, $2.25.

The preface and the jacket of this publication leave no doubt as to what the authors think of it. It is a "concise, concrete, and practical reference guide and text for students," including both beginners and practising bacteriologists, and from the wide range of subjects considered these students include medical, dental, dairy, industrial, and agricultural workers. They claim a unique plan of organization which should be of "inestimable value" to users of the book.

The text is very inclusive, covering all fields of bacteriology—all in less than 220 pages of text. "The tables include the pathogenic hyphomycetes and yeasts, primary determinative culture media, plant diseases, soil microbiology, dairy bacteria, veterinary pathogens, human pathogens, dental bacteria, colon typhoid differentiation, and tables of toxins and antitoxins."

The organization of the book strikes us as being good, even if too inclusive. A glossary covers 14 pages. National and State Board Questions in medicine, veterinary medicine and nursing require 14 pages. It will be seen at once that the treatment of everything is condensed, making the book more of a quiz compend than a text. There are some excellent charts, tables, and pictures.

Conceding the desirability of a book of this type, accuracy is of the first importance. Unfortunately this text contains many errors, many ambiguous statements, many misspellings, and wrong use of words. The English is of the "catch as catch can" type. The first chapter is called History of Bacteriology. We are told that Edwin Klebs "about 1893 isolated the bacteria causing diphtheria" and that Loeffler worked with him in doing this in 1883. At the Wiesbaden Congress (1883) Klebs did not even mention attempts at cultivation or experiments on animals. Klebs saw the diphtheria bacillus but also cocci and believed that there were two types of diphtheria, one due to the cocci and one bacillary. Loeffler, an assistant of Koch—not Klebs—isolated the germ in pure culture (1884) and proved its relationship to the disease. Ehrlich is said to have formulated the humoral theory of immunity. This was due to Buchner. Ehrlich formulated the side-chain theory of immunity. Kitasato is credited with having devised a serum treatment for cholera for which we can find no authority. Sir Ronald Ross is called Hugh, and is credited with having "worked out the plasmodium malariae" whatever this may mean. Noguchi is credited with having discovered the virus of yellow fever, a claim never credited and disproved long ago.

The mistakes in the book are too numerous to mention in detail. A few examples only can be given. On page 126 we find Dorset's egg medium called "media" and two lines below Petroff's medium is properly called. In the same paragraph we find the terms "tuberculous" and "tubercular" both

used to indicate changes due to the tubercle bacillus, though the expression "tubercular milk" for milk from tuberculous cows is entirely incorrect. As forms of tuberculosis, we find "phythis," consumption; "acute miliary (sic) T. B., and scrofula tuberculosis." T. B. means tubercle bacillus, but it is repeatedly used as meaning tuberculosis. There is great confusion in the name of some stains; for example, we find Ziehl-Neelsen's, Zeihl's (sic) acid fast and Ziehl's carbol-fuchsin, all meaning one stain. The names of authors show the same carelessness. We find among books consulted, Zinsser and Bayne-Jones, but later it is reduced to "Zinsser and Jones." An author is entitled to his own name, even if it is hyphenated.

As an example of bad English we find "Antigens (means to form antibodies) are bacteria or their products which stimulate the production. . . ." Page 116, "G. Serological Diagnostic Tests," gives staining of pus, prophylaxis, etc., but no serology. The description of the "Widal or Microscopic Agglutination Tests" on page 203 is too indefinite.

The author acknowledges help and advice from many people, including the President of the Baltimore City College, the Professor of Bacteriology of the Medical School of the University of Maryland, Department of Bacteriology of the University of Alabama, and the Professor of Pathology in the Medical School of the University of Virginia. We wish they had given more advice.

The make-up and printing are good, but the proof reading is poor. We have given perhaps an unnecessary amount of space to this book, but as it is intended for students, many of whom will probably have no opportunity of going further and obtaining correct information, it seems necessary. We see no excuse for putting a book with so many errors on the market.

MAZŸCK P. RAVENEL

Handbook of Chemistry—*By Dr. N. A. Lange (2nd ed.). Sandusky, Ohio: Handbook Publisher,* 1938. 1500 pp. with Appendix of 241 pp., by Dr. R. S. Burington, and Index of 30 pp. Price, $6.00.

The second edition of this handbook has been brought up to date by revision of 31 tables and addition of 16 new tables as well as other changes.

Naturally a compiler of such a book has difficulty in deciding what data should be included without presenting an unwieldy volume but much of the tabular information desired by the scientist is to be found.

Several tables have been put up in an unusual style. These were found to be even more convenient than the ordinary type table when used. With over 170 tables of chemical, physical constants and a section of 250 pages of mathematical data its value to the scientist can only be appreciated after continued use in the laboratory. It should be a valuable addition to the library of not only the chemist, but physicist, biologist or, in fact, any scientist working in any related field who cannot take the time or who lacks the library facilities to find much of the information herein contained.

CARL S. PEDERSON

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH.D.

"See Your Dentist Twice a Year"—In Detroit, the national health canvass was widened to include questions about visiting the dentist and the dental care received. Less than a quarter of the people canvassed had seen the dentist at any time during the year (excluding visits for extractions), the proportion varying with the economic status of the household from 42 per cent for professional to 16 per cent for unskilled workers.

BRITTEN, R. H. A Study of Dental Care in Detroit, Michigan. Pub. Health Rep. 53, 12:446 (Mar. 25), 1938.

Teaching Public Health to Medical Students—As practising physicians over 50 years of age received no teaching in hygiene, it is no wonder that preventive medicine is still considered a "minor." Although important strides have been made in teaching public health in recent years, there are still many more to go before the subject achieves its majority.

FITZGERALD, J. G. Undergraduate Instruction in Preventive Medicine. J.A.M.A. 110, 17:1322 (Apr. 23), 1938.

More Pasteurization Problems—Units which utilize the hot pasteurized milk to pre-heat the incoming cold raw milk (thus partially cooling the pasteurized milk) should keep the hot milk under greater pressure than the cold to avoid possible contamination of the pasteurized milk through mechanical flaws. Measures for insuring this safeguard are described.

FUCHS, A. W. Contamination of Pasteurized Milk by Improper Relative Pressures in Regenerators. Pub. Health Rep. 53, 13:496 (Apr. 1), 1938.

How Detroit Provides School Medical Services—Describing the plan of having school medical work done by practising physicians appointed by the county medical society for 2 year periods, it is recorded that each doctor works one morning a week under supervision. School officials and parents are pleased, and the city is well seeded with young doctors who have had some contact with public health matters.

GUDAKUNST, D. W. The Private Physician in the School. J. Hyg. & Phys. Educ. 9, 4:207 (Apr.), 1938.

Some Evidence of Hereditary Tendency to Cancer—Studying mortality records in 10 Massachusetts towns it was found that among the ancestors of persons with cancer the death rate from that disease was over 1 per cent higher than the normal expectancy of cancer deaths. In another study when one parent had cancer, 10.5 per cent of the known children developed the disease, whereas only 8.6 per cent succumbed to it among those whose parents were not cancerous.

LOMBARD, H. L. Studies on the Familial Aspects of Cancer. New Eng. J. Med. 218, 17:711 (Apr. 28), 1938.

Better Baby Hospitalization—Public health administrators will be interested in this committee's findings upon the hospitalization of infants. Pointing out that, despite improvement, flaws still exist in isolation procedures and that air-borne infection may be more important than we think, certain promising rules for improving hospitalization of babies are proposed.

MCKHANN, C. G., *et al.* Hospital Infections. Am. J. Dis. Child. 55, 3:579 (Mar.), 1938.

Ability to Pay for Health—Inadequacies in our public health services are presented in persuasive sta-

tistics. Any one who can maintain his complacency in the face of this factual exhibit deserves some sort of medal.

MOUNTIN, J. W., and O'HARA, H. Differences in Opportunities for Health. Pub. Health Rep. 53, 13:485 (Apr. 1), 1938.

The Rickettsioses—If your knowledge of the rickettsioses is hazy, you will find much in this excellent discussion of endemic typhus and Rocky Mountain spotted fevers. The wood tick, the dog tick, and the rabbit tick are all hosts and 5 other ticks may be implicated. Infection acquired by the larvae is passed on to the adult. As it is probable that spotted fever has been endemic in the east and central regions as long as in the west, it is regrettable that it was saddled with the name "Rocky Mountain."

PARKER, R. R. Rocky Mountain Spotted Fever. J.A.M.A. 110, 15:1185 (Apr. 9), 1938.

Futility of Contact Exclusion—This British Health Officer holds that, in urban areas, contacts of children suffering from communicable diseases should not be excluded automatically from school.

PAUL, H. Present Practice in Regard to Quarantine and Disinfection. Pub. Health. 51, 7:203 (Apr.), 1938.

For All to Read—This dissertation should be required reading for all sanitarians. Not only is it an excellent example of the way a scientific subject may be presented to an intelligent lay audience, but it is filled with useful data about longevity based upon many other factors than tobacco smoking about which so much newspaper publicity appeared.

PEARL, R. The Search for Longevity. Sci. Month. May, 1938, p. 462.

Good Family Survey Methods—Can reasonably accurate reports of family health practices be obtained by house-to-house canvassers sent to gather information from a responsible member of the family? In 3 southern counties the canvass findings were checked by services utilized and the answer was: in the main, yes.

PENNELL, E. H., and O'HARA, H. The Validity of Health Service Data Gathered by the Family Survey Method. Pub. Health Rep. 53, 12:439 (Mar. 25), 1938.

What Is New in Sewage?—Review of the past year's grist of studies on the chemistry and biology of sewage treatment, sludge digestion, industrial wastes, the various uses of chlorine, and in the field of stream pollution. Of the 65 million United States population served with sewers, the sewage of 25 million is treated to some degree, whereas the remainder is discharged completely untreated into streams, lakes, and the ocean. The sewage load accumulates faster than it is being properly cared for.

PHELPS, E. B., *et al.* Research in Sewage Chemistry, Sewage Treatment, and Stream Pollution. Sewage Works J. 10, 2:173 (Mar.), 1938.

About Pellagra—Something of the history and research on this interesting dietary deficiency disease, together with modern methods of prevention and treatment. Nursing care, which is still of utmost importance despite all the therapeutic advances, is excellently outlined in a companion article by Miss Van Blarcom.

SEBRELL, W. H. Endemic Pellagra. Am. J. Nurs. 38, 5:507 (May), 1938.

More about Polio Prevention—When zinc sulphate is used as a prophylactic against poliomyelitis, the way to apply it is to instill it into the nostrils while the head is completely inverted: 0.25 c.c. to 0.5 c.c. is a sufficient quantity.

SHAHINIAN, L., *et al.* Chemo-prophylaxis in Poliomyelitis. J.A.M.A. 110, 16:1254 (Apr. 10), 1938.

Visual Health Education—We had an epidemic of health movie dramas about a dozen years ago, but the disease burned itself out to give us a few years of comparative immunity when the health movie fever reached a state of endemicity. We are about to experience a new pandemic of talkies about hygiene, if this movie epidemiologist reads the signs aright.

WEISS, M. Box Office Attraction of Health Movies. Health Officer. 2, 10:504 (Feb.), 1938.

For Complete Community Nursing—After considering the whole field of nursing, public health, institutional, and private duty, the author concludes that a fully coördinated system of nursing in home, industry, and hospital, for rich and poor, including instruction and bedside care, is one of today's vital social problems. It is yet unsolved.

WINSLOW, C.-E. A. Nursing and the Community. Pub. Health Nurs. 30, 4:230 (Apr.), 1938.

BOOKS RECEIVED

IN THE NAME OF COMMON SENSE. By Matthew N. Chappell. New York: Macmillan, 1938. 192 pp. Price, $1.75.

CHILD GUIDANCE PROCEDURES. Institute for Juvenile Research, Paul B. Schroeder, M.D., Director. New York: Appleton-Century, 1937. 362 pp. Price, $2.50.

THE TREATMENT OF CLINICAL AND LABORATORY DATA. An Introduction to Statistical Ideas and Methods for Medical and Dental Workers. By Donald Mainland. Edinburgh, Scotland: Oliver & Boyd, 1938. 340 pp. Price, $4.50.

THE ADOLESCENT. By Ada Hart Arlitt. New York: McGraw-Hill, 1938. 242 pp. Price, $2.00.

PLAY AND MENTAL HEALTH. Principles and Practice for Teachers. By John Eisele Davis. New York: Barnes, 1938. 202 pp. Price, $2.50.

THE HOSPITAL HEAD NURSE. Her Functions and Her Preparation. By Mary Marvin Wayland. New York: Macmillan, 1938. 388 pp. Price, $3.50.

SOCIAL AGENCY BOARDS AND HOW TO MAKE THEM EFFECTIVE. By Clarence King. New York: Harper, 1938. 102 pp. Price, $1.25.

EAT AND KEEP FIT. By Jacob Buckstein. New York: Emerson, 1938. 128 pp. Price, $1.00.

WILLIAM ALANSON WHITE, M.D. The Autobiography of a Purpose. Garden City: Doubleday, 1938. 293 pp. Price, $3.00.

FOOD VALUES OF PORTIONS COMMONLY SERVED. Compiled by Anna DePlanter Bowes and Charles F. Church. Philadelphia: Dolbey, 1937. 12 pp. Price, $.50.

THE BACTERIOLOGICAL EXAMINATION OF WATER SUPPLIES. (Report on Public Health and Medical Subjects No. 71.) London: His Majesty's Stationery Office, 1937. 38 pp. Price, $.50.

HEATING, VENTILATING, AIR CONDITIONING GUIDE, 1938. Published by the American Society of Heating and Ventilating Engineers, New York, 1938. 1188 pp. Price, $5.00.

PORTABLE UNIVERSAL pH INDICATOR FOR LABORATORY AND PLANT CATALOG. Published by Leeds & Northrup Co., Philadelphia, Pa.

DIET AND HIGH BLOOD PRESSURE. By Dr. I. Harris. Toronto: Longmans Green & Co., 1937. 196 pp. Price, $3.50.

INTERNSHIPS AND RESIDENCIES. Report of the New York Committee on the Study of Hospital Internships and Residencies. New York: Commonwealth, 1938. 492 pp. Price, $2.50.

JURISPRUDENCE FOR NURSES. By Carl Scheffel and Eleanor McGarvah. 2d ed. New York: Lakeside Pub. Co., 1938. 248 pp. Price, $3.00.

PRACTICAL PHYSIOLOGICAL CHEMISTRY. By Philip B. Hawk, Olaf Bergeim. 11th ed. Philadelphia: Blakiston, 1937. 968 pp. Price, $8.00.

PASTEUR: KNIGHT OF THE LABORATORY. By Francis E. Benz. New York: Dodd, Mead, 1938. 232 pp. Price, $2.00.

PUBLIC WORKS ENGINEERS' YEARBOOK, 1938. Chicago: American Public Works Association, 1938. 459 pp.

ASSOCIATION NEWS

HEALTH CONSERVATION CONTESTS

The Grading Committee charged with the responsibility of selecting the winning and meritorious achievement cities and counties in the 1937 Health Conservation Contests met on April 19.

In the City Contest, the following cities were announced as winners:

In Group I (cities of over 500,000 population) Boston, Mass., wins the first award. Additional awards in this population group go to Cleveland, Ohio, and Pittsburgh, Pa.

In Group II (cities of 250,000 to 500,000 population) Louisville, Ky., and Providence, R. I., receive first awards, and an additional award goes to Dallas, Tex.

In Group III (cities of 100,000 to 250,000) the winner is Hartford, Conn. Awards also go to Grand Rapids, Mich., Yonkers, N. Y., Reading, Pa., Erie, Pa., Honolulu, Hawaii, Lynn, Mass., Tacoma, Wash., and Knoxville, Tenn.

In Group IV (cities of 50,000 to 100,000 population) Sacramento, Calif., gets the first award and other awards go to Evanston, Ill., Newton, Mass., Greensboro, N. C., and Saginaw, Mich.

In Group V (cities of from 20,000 to 50,000 population) Greenwich, Conn., is the winner; and Plainfield, N. J., Auburn, N. Y., Winona, Minn., Elmira, N. Y., Watertown, N. Y., Pittsfield, Mass., Maplewood, N. J., and Orange, N. J., are given awards of merit.

In Group VI (cities of less than 20,000 population) Englewood, N. J., is the winner, and awards go to Hibbing, Minn., Virginia, Minn., and Middletown, N. Y.

In addition to these prizes, Special Awards were given to: Baltimore, Md., Brookline, Mass., Detroit, Mich., Hackensack, N. J., Newark, N. J., New Haven, Conn., Pasadena, Calif., Schenectady, N. Y., and Syracuse, N. Y.

Special prizes were awarded to the cities having the most effective community-wide programs for syphilis control and tuberculosis control. In the Syphilis Control Contest, the first award is given to Tacoma, Wash., with awards of merit going to Hartford, Conn., Newark, N. J., Louisville, Ky., and New Haven, Conn. In the Tuberculosis Control Contest, the winner is Detroit, Mich., with awards of merit going to Newton, Mass., Hartford, Conn., and New Haven, Conn.

The following counties or district health units were declared winners in the Rural Health Conservation Contest:

In the Northeastern Division, the winner is Columbia County, N. Y., and awards of merit go to Barnstable County, Mass., Saginaw County, Mich., Southern Berkshire District, Mass., Cortland County, N. Y., Mecosta-Osceola Health Unit, Mich., Richland County, Ohio, and Ottawa County, Mich.

In the Eastern Division, the winner is Fayette County, Ky., and awards of merit go to Wicomico County, Md., Washington County, Md., Jefferson County, Ky., Scott County, Ky., Mason County, Ky., Montgomery County, Md., Arlington County, Va., and Kent County, Del.

In the Southeastern Division, the winner is Pike County, Miss., and awards of merit go to Coahoma County, Miss., Lauderdale County, Miss., Pickens County, Ala., and Berkeley County, S. C.

In the North Central Division, the winner is Woodbury County, Iowa, and awards of merit go to Charles Mix County, S. D., Lewis and Clark County, Mont., Union County, S. D., and St. Louis County, Minn.

In the South Central Division, the winner is Amarillo-Potter County, Tex., and awards of merit go to Dallas County, Tex., and Shreveport-Caddo Parish, La.

In the Western Division, the winner is Clallam County, Wash., and awards of merit go to Spokane County, Wash., Yakima County, Wash., and Bannock County, Ida.

Special Awards were given to: Davidson County, Tenn., El Paso County, Tex., and Shawnee County, Kans.

In 1937 for the first time, a Health Con-

servation Contest was conducted in Canada. St. John's-Iberville-Laprairie-Napierville Counties Health Unit, Quebec was declared the winner and other awards were given to: St. Maurice County Health Unit, Quebec, Terrebonne County Health Unit, Quebec, St. James-St. Vital Health District, Manitoba, Kamouraska-L'Islet Health Unit, Quebec, Nicolet County Health Unit, Quebec, and Chateauguay Huntingdon Health Unit, Quebec.

The United States City and Rural Health Conservation Contests awards were presented at the Annual Meeting of the Chamber of Commerce of the United States in Washington, D. C., on May 2. The Canadian Rural Health Conservation Contest awards will be presented during the meeting of the Canadian Public Health Association in Halifax, Nova Scotia, Canada—June 20 to 22.

The awards for the Syphilis and Tuberculosis Control Contests will be presented to the health officers during the meeting of the American Public Health Association in Kansas City, October 25 to 28.

These contests are conducted annually by the Chamber of Commerce of the United States with the coöperation of the American Public Health Association. The Rural Health Conservation Contest is financed by the W. K. Kellogg Foundation and the City Health Conservation Contest by a group of insurance companies.

APPLICANTS FOR MEMBERSHIP

The following individuals have applied for membership in the Association. They have requested affiliation with the sections indicated.

Health Officers Section

J. Byron Baird, M.D., Health Department, Kingsville, Tex., Director, State Dept. of Health District 5

Charles J. W. Beckwith, M.D., D.P.H., P. O. Box 322, Sydney, N. S., Canada, Divisional Medical Health Officer, Dept. of Public Health

Emmanuel W. Billard, M.D., 33 E. 208 St., New York, N. Y., Physician in charge, Tuberculosis Clinic, Dept. of Health

Marvin A. Childers, Jr., M.D., 820 Alamo National Bank Bldg., San Antonio, Tex., Assistant City Health Officer

James H. Hill, M.D., Box 262, Talladega, Ala., County Health Officer

William B. Hunter, M.D., Lillington, N. C., Harnett County Health Officer

Lynn J. Lull, M.D., Municipal Bldg., La Junta, Colo., Otero County Health Officer

Charles F. Mares, M.D., 605 American National Bank Bldg., Galveston, Tex., County Health Officer

Robert M. Marr, M.D., 92 Elm, Westfield, Mass., Chairman, Board of Health

Harmon U. Sanders, M.D., Federal Bldg., Muskogee, Okla., Senior Physician, Five Tribes Agency

Walter L. Shepeard, M.D., McRae, Ga., Health Commissioner, Telford-Wheeler Counties

Marcus T. Smith, M.D., 541 Davis St., Conway, Ark., Medical Director, District 4

Murray Smith, M.D., Tuskegee, Ala., Macon County Health Officer

John E. Stoddard, M.D., City Hall, Meriden, Conn., Health Officer

Vernon A. Turner, M.D., Richlands, Va., Buchanan, Russell, Tazewell County Health Officer

Harold C. Whims, M.D., Rutherfordton, N. C., Rutherford County Health Unit

Laboratory Section

Elizabeth M. Baethke, 2338 McDowell St., Augusta, Ga., Laboratory Assistant, University of Georgia Medical School

Melba Black, 915 N. Center, Stockton, Calif., Bacteriologist, San Joaquin Local Health District

Rita L. Canessa, Rt. 4, Box 760, Stockton, Calif., Bacteriologist, San Joaquin Local Health District

Leigh H. Churchill, 2114 N. E. Wasco St., Portland, Ore., City Bacteriologist

Hal W. Cutshall, 1630 S. 14 East, Salt Lake City, Utah, Technician, State Board of Health

Michael A. Farrell, Ph.D., 420 Adams Ave., State College, Pa., Associate Professor of Bacteriology, Pennsylvania State College

Fay G. Gardner, 1325 S. 2nd East, Salt Lake

City, Utah, Stenographer, State Board of Health

Sidney E. Gilchrist, 105 S. State St., Salt Lake City, Utah, Chief, Division of Bacteriology, City Health Dept.

Dudley P. Glick, Ph.D., Colorado State College, Fort Collins, Colo., Assistant Professor of Bacteriology

John W. Hornibrook, M.D., National Institute of Health, Washington, D. C., P. A. Surgeon, U. S. Public Health Service

Margaret Ingersoll, 919 First Ave., Salt Lake City, Utah, Laboratory Technician, U.S.V.A.

Wilfrid C. Kennell, 6255 N. E. Willow, Portland, Ore., City Chemist

Thomas L. Martin, Ph.D., 20 E. 9th North, Provo, Utah, City Bacteriologist

Michael G. O'Connor, 47 Mooreland, Springfield, Mass., Chemist, Health Dept.

Edward V. O'Gara, 14th Ave. & Lake St., San Francisco, Calif., Medical Technician, U. S. Public Health Service Laboratory

J. Albert Paradis, Jr., P. O. Box 1809, Juneau, Alaska, Technician, Territorial Dept. of Health Laboratory

Roy E. Rudolph, Jr., 1476 E. 13 South, Salt Lake City, Utah, Bacteriologist, State Board of Health

Ralph B. Williams, 1498 W. 8th South, Salt Lake City, Utah, Bacteriologist, State Board of Health

Winfield F. Wood, 136 State Capitol, Salt Lake City, Utah, Serologist, State Board of Health

Vital Statistics Section

Theodore A. Janssen, 2305 Mt. View Pl., S. E., Washington, D. C., Chief of Nosology Section, Division of Vital Statistics, Bureau of the Census

Public Health Engineering Section

Clifford T. Ayres, Dept. of Public Health, Fort Worth, Tex., City Sanitary Engineer

Carle D. Brown, 388 N. Main, Salt Lake City, Utah, Sanitarian, State Board of Health

Harry L. DeLozier, 311 City Hall, Louisville, Ky., Chief, Division of Milk Control, Health Dept.

William R. Hardy, Box 82, Mineral Wells, Tex., District 2 Sanitary Engineer, State Dept. of Health

Glen J. Hopkins, 211 W. McCarty, Jefferson City, Mo., State Board of Health

Howard M. Hurst, State Capitol, Salt Lake City, Utah, Assistant Sanitary Engineer, State Board of Health

Robert D. Karstaedt, 110 W. School St., Visalia, Calif., Inspector, State Dept. of Public Health

George S. Moore, P. O. Box 125, Albemarle, N. C., Supt., Water & Light Dept.

George W. Newman, Route 1, Yuma, Ariz., Sanitarian, Yuma County Public Health Service

Newell W. Pickett, 2018 S. 6th East, Salt Lake City, Utah, Sanitary Inspector, State Board of Health

Elmer B. Quist, Public Health District 2, Cedar City, Utah, Sanitarian, District 2, State Board of Health

Robert Y. Rhyne, County Health Dept., Wadesboro, N. C., Sanitarian, Anson County Health Dept.

Ellis R. Shields, 266 N. 2nd East, Price, Utah, District Sanitarian, State Board of Health

E. I. Stewart, Jr., 327 E. 1st South St., Salt Lake City, Utah, Sanitarian, State Board of Health

Augustus F. Sweetland, P. O. Box 335, Fort Valley, Ga., District Supervisor, State Dept. of Public Health

Ward Warnock, 207–24 St., Ogden, Utah, Sanitarian, Health District 1, State Board of Health

Food and Nutrition Section

Walter R. Lowry, 903–2nd Ave., Salt Lake City, Utah, Sanitarian, City Board of Health

Charlotte Raymond, 12 Austin St., Newtonville, Mass., Community Nutritionist, City Health Dept., etc.

Alexander A. Singer, 225 E. 79 St., New York, N. Y., Senior Chemist, Dept. of Health

Rafael G. Venegas, D.V.M., Ministerio de Sanidad, Caracas, Venezuela, S. A., Jefe de Abasto de Leche

Oscar Zurer, 993 President St., Brooklyn, N. Y., Health Inspector, Department of Health

Child Hygiene Section

Orren Lloyd-Jones, M.D., Ph.D., 1930 Wilshire Blvd., Los Angeles, Calif., Lecturer in Public Health, University of California at Los Angeles

Chlima Taback, M.D., 1463 Ocean Ave., Brooklyn, N. Y., School Physician, East New York Vocational High School

Marie Wickert, 123 E. 16 Ave., Denver, Colo., Assistant Director, Division of Crippled Children, State Board of Health

Philip W. Woods, D.D.S., Bureau of Health, Augusta, Me., Director, Division of Dental Hygiene

Public Health Education Section

Edgar A. Farrow, M.D., Box 1010, Cedar City, Utah, Supt. and Physician of Pointe Indian Agency, U. S. Indian Service

Bruno Gebhard, M.D., 128 Webster Ave., Manhasset, L. I., N. Y., Exhibit Consultant, Committee on American Museum of Hygiene, A.P.H.A.

Norman F. Gerrie, D.D.S., Rm. 130, State Capitol, Salt Lake City, Utah, Charge of Mobile Dental Unit, State Board of Health

Lyman D. Heacock, D.D.S., 306 State Bldg., San Francisco, Calif., Chief of Dental Service, Bureau of Child Hygiene, State Dept. of Public Health

Bertha K. LaFleur, 3012 Sunnyslope, Miami, Ariz., School Nurse, Globe Public Schools

Elden L. Stewart, 11104 N. E. Wygant St., Portland, Ore., Sanitary and Milk Inspector, Wasco County Health Unit

Florence E. Strause, 309 W. 109 St., New York, N. Y., Supervisor, Highbridge office, Henry St. Visiting Nurse Service

Public Health Nursing Section

Bride L. Cawthon, City Health Dept., Memphis, Tenn., Director, Division of Public Health Nursing

Margaret P. Dietz, Vernal, Utah, Public Health Nurse, State Board of Health

Mary H. Emberton, R.N., 1063 Monroe St., Denver, Colo., Advisory Nurse, Maternal and Child Health, State Dept. of Health

Laura C. Harstad, 816 Oregon Bldg., Portland, Ore., Maternal-Child Health Consultant, State Board of Health

Louella Mahoney, R.N., Salt Lake General Hospital, Salt Lake City, Utah

Marcella M. McInnerny, 336 E. S. Temple, Salt Lake City, Utah, State Director of Crippled Children's Service, State Board of Health

Mary McQuillen, R.N., 130 State Capitol Bldg., Salt Lake City, Utah, Supervisor, Staff Education, State Board of Health

Mary C. Robinson, R.N., 961–3rd St., Yuma, Ariz., Supervising Nurse, Yuma County Public Health Service

Belle J. Rosenstock, 141 Hawks Court, Salt Lake City, Utah, Field Nurse, Utah Tuberculosis Assn.

Margrete Skaarup, State Health Dept., Bismarck, N. D., Supervisor, Public Health Nursing, State Health Dept.

Joy B. Stuart, Ambassador Hotel, Salt Lake City, Utah, Maternal and Child Health Advisory Nurse, State Board of Health

Frances A. Sweeney, R.N., State Teachers College, Flagstaff, Ariz., School Nurse

Bessie Williams, Box 96, Hood River, Ore., County Nurse

Margaret A. S. Willmon, Box 1505, Yuma, Ariz., Nurse, Yuma County Health Service

Epidemiology Section

Louventure Alcindor, M.D., Avenue Cameau, Port-au-Prince, Haiti, Public Health Officer, Port-au-Prince Haitian General Hospital

Leopoldo Briceno-Iragorry, Clinica Luis Razetti, Caracas, Venezuela, S. A., Medico Epidemiologo, Ministerio de Sanidad

Lincoln de Freitas, Filho, C.P.H., National Health Dept., Rio de Janeiro, Brazil, S. A., Health Officer

Paul A. Keeney, M.D., University Club, Harrisburg, Pa., Acting Director, Child Health and Maternal Welfare, and Epidemiologist, State Dept. of Health

Irving Rappaport, 864 Cauldwell Ave., New York, N. Y., Research Assistant in Parasitology, Cornell University Medical College, Dept. of Public Health (volunteer)

Unaffiliated

Eloise B. Cram, Ph.D., National Institute of Health, Washington, D. C., Senior Zoölogist

Victor H. Haas, M.D., U. S. Public Health Service Laboratory, San Francisco, Calif., Commissioned Officer

John M. Hayek, M.D., 2319–46 St., Des Moines, Ia., Acting Director, Division of Child Health and Health Education, State Dept. of Health

Joseph R. Horn, D.D.S., 617 W. 168 St., New York, N. Y., Educational work with Oral Hygiene Committee of Greater New York

Catherine F. Ronan, D.M.D., 145 Federal St., Salem, Mass., Dental Supervisor, State Dept. of Public Health

Clement Scott, M.D., 6526 Scotten, Detroit, Mich., Student

John Williams, 10916–100 Ave., Edmonton, Alta., Canada, Health Inspector, Local Board of Health

CLOSING DATE FOR SUBMITTING APPLICATIONS FOR FELLOWSHIP

SEPTEMBER 1 is the latest date the Committee on Eligibility can accept Fellowship applications. This date is set in order that there may be sufficient time to route them through the preliminary steps necessary before they receive final consideration at the hands of the Governing Council during the Kansas City Annual Meeting. Eligible members who wish to apply for Fellowship are therefore urged to submit their applications in the near future.

EMPLOYMENT SERVICE

The Employment Service will register persons qualified in the public health field without charge. Public health nurses are registered with the Joint Vocational Service, 122 E. 22 Street, New York, N. Y., with which the Association coöperates.

Replies to these advertisements, indicating clearly the key number on the envelope, should be addressed to the American Public Health Association, 50 W. 50 Street, New York, N. Y.

POSITIONS WANTED

HEALTH OFFICERS

Experienced physician, administrator, epidemiologist and teacher, now employed, with C.P.H. from Johns Hopkins, and 14 years' public health background, will consider position. Prefers epidemiology in city or state department. Excellent references. **A355**

Physician, M.D., Yale; M.S.P.H., Columbia; good clinical background; will consider appointment in child health, epidemiology or public health administration. **A350**

Physician, aged 38, with excellent training in medicine, pediatrics and epidemiology, is completing work for Dr.P.H., and will consider appointment in administration, preferably in county health work. **A366**

Physician, M.D., Class A medical school; M.P.H., Harvard School of Public Health; extensive experience in pediatrics and school medical service; also background of county health administration and teaching in medical school, will consider expanded opportunity in teaching or research. **A302**

Physician, experienced in health administration of cities and states, will consider attractive opening in maternal and child health or health education. **A343**

Physician, M.D., Class A school; M.S.P.H., University of Michigan, 1937; now serving as district state health officer, seeks full-time administrative position in city or county. **A367**

Physician, M.D., McGill; C.P.H., Johns Hopkins; excellent background of communicable disease control and school health service, seeks administrative public health position or as epidemiologist. **A368**

Physician, M.D., University of Cincinnati; with postgraduate training in venereal disease control, Johns Hopkins; now employed, is available for venereal disease control officer. A363

Physician, M.D., Tufts; C.P.H., Johns Hopkins; administrative experience large city health department, will consider position as health officer or epidemiologist. **A362**

HEALTH EDUCATION

Woman, M.D., Boston University; special work in Columbia and Massachusetts Institute of Technology; one year's experience in State Hospital; interested in psychiatry, desires position in the east in hospital for mental diseases, or industrial school. **H248**

Young woman, M.A. in Health Education, Teachers College, Columbia University; with splendid international experience, seeks position as director of health education with preference for New York City. **H369**

Woman, with excellent preparation and wide experience in health education field; organization, administration, supervision and program making in city, rural and state work. Now employed but would consider good opportunity. $3,500 minimum. **H316**

LABORATORY

Experienced bacteriologist with teaching in research background, seeks position as director of laboratory. **L370**

Bacteriologist and pathologist with wide administrative experience; Ph.D., Brown University, will consider leading position in his field. **L371**

SANITARY ENGINEERING

Graduate Sanitary Engineer with service under U. S. Public Health Service and state departments of health, especially interested in filtration plant design and operation and shellfish sanitation, seeks employment. **E356**

Experienced sanitary engineer, graduate of M.I.T., seeks responsible position. **E372**

CHILD HYGIENE

Experienced physician, M.D. and Ph.D., University of Minnesota; specially qualified in maternal and child hygiene, directing state and local programs; will consider position of better sort. **A238**

MISCELLANEOUS

Young man, Sc.D., Johns Hopkins; experience in public health and research bacteriology; will consider position in public health work or university teaching. **L312**

Dentist, graduate of Temple University, with excellent postgraduate experience, desires position in administrative aspects of dental hygiene. **M352**

NEWS FROM THE FIELD

VENEREAL DISEASE CONTROL BILL PASSES CONGRESS

THE United States Senate, on May 17, passed and sent to the White House the LaFollette-Bullwinkle Bill, providing for a study of venereal disease control measures and the expansion of a program. The measure authorizes appropriations to finance activity by the Public Health Service and coöperation with states to the amount of $3,000,000 for the fiscal year beginning July 1, 1938, $5,000,000 the next year and $7,000,000 the third year, "and thereafter such sums annually as Congress may determine for the purposes of the Act."

The Bill in its final form passed both the House and the Senate by unanimous vote and was sent to the White House with the expectation that it would be signed by the President. The sponsors of the Bill point out that this is not an appropriation and that it will now be necessary to present estimates to the budget director, and ask the appropriating committees of the House and Senate for the inclusion of this item in the Deficiency Appropriation Bill in order to make funds actually available.

STUDY OF MUNICIPAL ABATTOIRS

A STUDY of the cost and operation of 32 city owned abattoirs and the methods employed for the control of private slaughterhouses has been published jointly by the American Municipal Association and the International City Managers' Association, 1313 East 60 Street, Chicago, Ill.

Of the 25 municipal abattoirs in the United States municipally owned and operated for which figures are presented, 11 are operated by health departments. Construction costs of these plants run from a few thousand dollars to over $100,000 and the annual operating costs from $2,800 to $33,000 some of which is offset by revenues from fees.

WESTERN BRANCH COMMITTEE ON MILK CONTROL

IN order to take advantage of the presence of Robert S. Breed, Ph.D. (Chairman of the Standard Methods Committee on Examination of Dairy and Food Products, Laboratory Section, A.P.H.A.), P. W. Covington, M.D., President of the Western Branch A.P.H.A., has appointed a Committee on Milk Control which will function at the Western Branch annual meeting in Portland, Ore., June 6–8. The personnel of the committee is as follows:

Chairman: Professor Courtland S. Mudge —College of Agriculture, University of California, Davis, Calif.

William Levin, Dr.P.H.—Director of Laboratories, State Department of Health, Portland, Ore.

Austin U. Simpson, M.D.—Director of Laboratories, State Department of Health, Seattle, Wash.

Charles W. Duckworth, D.V.M.—Bureau of Animal Husbandry, Sacramento, Calif.

E. H. Bramhall—Director of Laboratories, State Department of Health, Salt Lake City, Utah.

Dr. Raymond VanBuren Stone—Director of Laboratories, Los Angeles County Department of Health, Los Angeles, Calif.

Lewis H. Howard, M.D.—Health Officer of Pima County, Tucson, Ariz.

OBSTETRICS AND PEDIATRICS COURSES

THE Minnesota State Medical Association, in coöperation with the University of Minnesota Medical School and State Department of Health, began

the second state-wide graduate course in obstetrics and pediatrics in Crookston and Winona, Minn., May 7. The lectures were also given in Hibbing, Willman, Albert Lea, Fergus Falls, Worthington, and Bemidji, Minn.

The Illinois State Department of Health, in coöperation with the educational committee of the State Medical Society, will begin a series of weekly courses on obstetrics and pediatrics on July 5. These will be held at the Research and Educational Hospital, University of Illinois College of Medicine, and will continue through July and August.

SOUTH CAROLINA PUBLIC HEALTH ASSOCIATION MEETING

THE South Carolina Public Health Association held its annual meeting at Myrtle Beach, May 23. New officers of the Association are as follows:

President—W. K. Fishburne, M.D., of Moncks Corner

Vice-President—William B. Furman, M.D., of Pickens

Secretary and Treasurer—Mrs. Frank George, R.N., of Columbia

Representative to the A.P.H.A.—James A. Hayne, M.D., of Columbia

Speakers from outside the state included: Arthur T. McCormack, M.D., President, A.P.H.A.; John A. Ferrell, M.D., Chairman of the Executive Board, A.P.H.A.; Reginald M. Atwater, M.D., Executive Secretary, A.P.H.A.; and Harry J. Mustard, M.D., Biggs Professor of Preventive Medicine, New York University.

PHYSICAL EDUCATION ASSOCIATIONS MERGE

THE forty-third annual convention of the American Association for Health and Physical Education was held in Atlanta, Ga., April 20–23.

The American Association for Health and Physical Education became a department of the National Education Association in 1936 after a merger of the American Physical Education Association and the Department of School Health and Physical Education of the National Education Association. The new department will be represented by an executive secretary at N.E.A. headquarters, Washington, D. C., after September, 1938, when the association's offices will be moved to that city. The new department will continue the publication of its magazine, *The Journal of Health and Physical Education*.

At the Atlanta convention the association revised its name and will now be known as the American Association for Health, Physical Education and Recreation.

The following officers were elected:

President—Dr. N. P. Neilson, Stanford University, Calif.

President-elect—Margaret Bell, M.D., University of Michigan, Ann Arbor, Mich.

Vice-Presidents—Health Section, Dorothy B. Nyswander, Ph.D., New York, N. Y.; Physical Education, Grover W. Mueller, of Philadelphia, Pa.; Recreation, Frank S. Lloyd, of New York, N. Y.

The association will meet in San Francisco, Calif., in 1939.

NURSING DIRECTOR HONORED

GRACE Ross, R.N., Director of Nursing of the Detroit Department of Health, was elected President of the National Organization for Public Health Nursing at the biennial meeting of that association which was held in Kansas City April 24–29.

Miss Ross came to the department in 1914 and was made Director of Nursing in November, 1915. At that time the nursing personnel numbered 68, and through her efforts qualifications and standards for nursing in the department have been raised to the highest in the country. The nursing staff membership today is 424. It was

stated that the evolution of public health nursing, from a few small technics of specialized service to a generalized service which covers 70 per cent of the city, may be credited to Miss Ross's determined effort to supply the best possible education for health for the largest number of persons, at the least expense to the community.

MENDEL MEDAL AWARDED DR. PARRAN

THOMAS Parran, M.D., Surgeon General of the U. S. Public Health Service, received in May the Mendel Medal from Villanova College for outstanding work in science. Dr. Parran will be the tenth recipient of the Mendel Medal award founded by the College in 1928 in honor of Gregor Mendel, Abbot of the Augustinian Monastery, Brunn, Austria, who gave to the world the Mendelian Laws of heredity.

PERSONALS

Central States

CLARENCE D. BARRETT, M.D.,* of East Lansing, Mich., Director of the Bureau of Communicable Diseases of the Michigan State Department of Health, has been placed in charge of a newly created full time health unit in Ingham County, with offices at Lansing.

GEORGE D. BLUME, M.D., was recently appointed Health Commissioner of New Boston, Ohio.

FILIP C. FORSBECK, M.D.,* for 6 years Assistant Director of the Bureau of Communicable Diseases of the Michigan State Department of Health, has been appointed Director, succeeding CLARENCE D. BARRETT, M.D.*

THOMAS E. GIBSON, M.D.,† of Paw Paw, Mich., has been appointed Health Director of Van Buren County. He was Health Director of Eaton County.

JAMES N. PATTERSON, M.D., formerly Assistant Professor of Pathology, at the University of Cincinnati College of Medicine, has been appointed Director of Laboratories by the Florida State Department of Health. He will succeed the late PAUL EATON, M.D.†

Eastern States

RUFUS COLE, M.D., D.Sc.,† Director of the hospital of the Rockefeller Institute, New York, since 1909, received the George M. Kober Medal for distinguished service to medicine from the Association of American Physicians. Dr. Cole's work on pneumonia and the pneumococcus, as well as his efforts in the whole science of bacteriology, was praised by Dr. Frederick F. Russell, of Boston, who made the presentation.

BENJAMIN C. GRUENBERG, PH.D.,* of New York, is a member of the Committee on Biological Science Teaching of the Union of American Biological Societies, which has received a grant from the Carnegie Corporation of New York for the Advancement of Teaching toward support of the educational program.

JAMES J. MINOT, M.D.,† of Boston, Mass., has been elected to the newly created position of Honorary President of the Boston Tuberculosis Association.

MATTHIAS NICOLL, JR., M.D.,* of White Plains, N. Y., Commissioner of Health of the Westchester County Department of Health, retired on April 30, after serving since the organization of the Department in 1930. Dr. Nicoll was formerly State Commissioner of Health of New York. He is succeeded by GEORGE H. RAMSEY, M.D.,* recently Assistant Commissioner of the New York State Department of Health.

* Fellow A.P.H.A.
† Member A.P.H.A.

JOHN E. STODDARD, M.D., has been appointed Health Officer of Meriden, Conn., to succeed MICHAEL J. SULLIVAN, M.D.†

DR. WINFIELD E. WIGHT is the new Health Officer of Thomaston, Conn., succeeding DR. JAMES H. KANE, resigned.

Southern States

HAROLD W. BROWN, M.D., Sc.D., DR.P.H.,† Professor of Preventive Medicine and Public Health at the University of North Carolina, Chapel Hill, N. C., spoke at Duke University, April 14. The subject of the lecture was "Hookworm."

ARTHUR T. MCCORMACK, M.D.,* Commissioner of Health of Kentucky, was a guest speaker at the 72nd annual session of the Texas State Medical Association in Galveston, May 10–12. The subject of Dr. McCormack's talk was "Whose Responsibility Is Public Health and Medical Service?"

MEDICAL DIRECTOR GEORGE W. MCCOY,† of the U. S. Public Health Service, Washington, who for the past year has been carrying on field studies on the spread and prevalence of leprosy and the influence of control measures on the disease, will in future have headquarters for these studies and other official duties at New Orleans, La. In addition to his Public Health Service duties, Dr. McCoy is to organize and serve as head of the Department of Preventive Medicine of Louisiana State University Medical School, which Department the University is establishing this year.

WILLIAM J. MURPHY, M.D.,† of Kingsport, Tenn., Assistant Health Officer of Sullivan County, has been appointed to the staff of the Tennessee State Department of Health for work in venereal disease control.

* Fellow A.P.H.A.
† Member A.P.H.A.

Western States

SAIDIE ORR DUNBAR,* Executive Secretary of the Oregon State Tuberculosis Association, was elected President of the General Federation of Women's Clubs at their meeting in May, in Kansas City, Mo.

DR. MARTHA E. D. RINEHART-ALLEN is the new Health Officer of Fairfax, Calif., succeeding DR. BERNARD J. CONROY.

DR. ALPHONSO O. SKANCKY has been appointed Health Officer of San Bruno, Calif., to succeed the late DR. FRANK HOLMES SMITH.

Puerto Rico

EDUARDO GARRIDO-MORALES, M.D., DR.P.H.,* Commissioner of Health of Puerto Rico, San Juan, P. R., has recently been acting as Governor of Puerto Rico during the absence of Governor Winship. Dr. Garrido-Morales has been reappointed as Commissioner of Health for 4 years and his appointment was unanimously confirmed by the Senate.

DEATHS

DR. WILLIAM FRANKLIN ELGIN,* associate of the late Dr. Walter Reed, died April 18. He was 76 years old. Long a prominent bacteriologist and formerly a practising physician, Dr. Elgin was a pioneer in the development of vaccines. He specialized in smallpox vaccine production and improved methods of preparation. Dr. Elgin belonged to the American Medical Association, American Public Health Association, American Bacteriological Society, and the Medical and Chirurgical Faculty of Maryland.

ROBERT W. FOWLER, M.D.,† for 42 years connected with public health work in New York, N. Y., died April 28, at the age of 64.

PROFESSOR DR. MAX NEISSER, Professor of Hygiene and Bacteriology at Frankfort-am-Main, Germany, died at the age of 69. He was well known for his bacteriologic work on the differential diagnosis of the diphtheria bacillus and on the staphylococcus, and made valuable contributions to knowledge of the mutation of bacilli.

FRANK L. WATKINS, M.D.,* City-County Health Officer of Great Falls, Mont., since 1930, died April 7, of pneumonia, age 58. In 1908 he was appointed to establish the Bureau of Vital Statistics in the State of Ohio, which was regarded as a model in the United States. In 1911 he received the appointment as Special Agent of the Division of Vital Statistics for the government. Prior to 1930, he was associated with the State Health Departments of Minnesota, Mississippi, and Florida. He was Director of Health Education in the city schools of Tulsa, Okla., for 6 years. He was a member of the A.P.H.A. from 1927 and a Fellow from 1931.

BENJAMIN WHITE, PH.D.,* died April 28, in Southern Pines, N. C., at the age of 59. Dr. White was Director of the Division of Biologic Laboratories, Massachusetts Department of Health, which position he held until his retirement in 1933. Under the sponsorship of the Commonwealth Fund, of which he was a consultant, Dr. White wrote a recent volume entitled *The Biology of the Pneumococcus*. He was an active member of the Massachusetts Public Health Association.

WADE HAMPTON FROST, M.D.,* Professor of Epidemiology in the Johns Hopkins School of Hygiene and Public Health, Baltimore, Md., died on May 1. (See Editorial, page 773.)

* Fellow A.P.H.A.

CONFERENCES AND DATES

American Academy of Tuberculosis Physicians. San Francisco, Calif. June 17–18.

American Association of Industrial Physicians and Surgeons—23rd Annual Meeting; and Second Annual Midwest Conference on Occupational Diseases. Palmer House, Chicago, Ill. June 6–9.

American Association of Medical Milk Commissions. San Francisco, Calif. June 13–14.

American Association of Medical Social Workers; and American Association of Psychiatric Social Workers. Seattle, Wash. June 26–July 2.

American Association of Social Workers. Seattle, Wash. June 26–July 2.

American Dental Association. Hotel Statler, St. Louis, Mo. October 24–28.

American Dietetic Association—21st Annual Meeting. Hotel Schroeder, Milwaukee, Wis. October 9–14.

American Federation of State, County, and Municipal Employees. Atlanta, Ga. August 29.

American Heart Association. Sir Francis Drake Hotel, San Francisco, Calif. June 10–11.

American Home Economics Association—31st Annual Meeting. William Penn Hotel, Pittsburgh, Pa. June 28–July 1.

American Medical Association. Hotel Sir Francis Drake, San Francisco, Calif. June 13–17.

American Medical Women's Association—National Convention. Fairmont Hotel, San Francisco, Calif. June 12–14.

American Public Health Associa-

tion — **67th Annual Meeting. Hotels Muehlebach, President, Kansas Citian, Kansas City, Mo. October 25–28.**

American Public Welfare Association —Joint Meeting with National Conference of Social Workers. Seattle, Wash. June 26–July 2.

American Society of Planning Officials. Joint Conference with American Planning and Civic Association, and American City Planning Institute. Minneapolis, Minn. June 20–22.

American Veterinary Medical Association. New York, N. Y. July 5–9.

Association of Military Surgeons of the United States. Mayo Clinic, Rochester, Minn. October 13–15.

Health Officers and Public Health Nurses—Annual Conference. Under the Auspices of the New York State Department of Health. Saratoga Springs, N. Y. June 22–24.

International Association for Identification. Columbus, Ohio. August 16–20.

Medical Library Association. Hotel Somerset, Boston, Mass. June 28–30.

Medico-Military Inactive Duty Training Unit—under auspices of the Mayo Foundation. Mayo Clinic, Rochester, Minn. October 13–15.

Michigan Public Health Association. Lansing, Mich. November 9–11.

Mississippi Valley Conference on Tuberculosis—25th Annual. Twelve states represented. Hotel Statler, St. Louis, Mo. September 21–24.

National Conference of Social Workers—Joint Meeting with American Association of Schools of Social Work, and American Association of Schools of Social Work. Seattle, Wash. June 26–July 2.

National Education Association. Pennsylvania Hotel, New York, N. Y. June 26–30.

National Hospital Association (Negro). Hampton, Va. August 14–16.

National Tuberculosis Association. Biltmore Hotel, Los Angeles, Calif. June 20–23.

New Mexico Public Health Association. Las Vegas, N. M. October 30, 31, November 1.

New York State Association of School Physicians—Annual Meeting. Grand Union Hotel, Saratoga Springs, N. Y. June 27.

New York State Department of Health —Annual Conference. Saratoga Springs, N. Y. June 28–30.

New York State Sewage Works Association—Fall Meeting (joint meeting with New England Sewage Works Association). Hotel Bond, Hartford, Conn. October 6–8.

New York State Sewage Works Association—Spring Meeting. Buffalo, N. Y. June 3–4.

Pacific Coast Branch of State Registration Executives. Hotel Multnomah, Portland, Ore. June 6–8.

Pennsylvania Sewage Works Association—12th Annual Conference. State College, Pa. June 8–10.

Social Work Publicity Council. Seattle, Wash. June 26–July 2.

Southern Branch, American Public Health Association—7th Annual Meeting; and Southern Medical Association. Oklahoma City, Okla. November 15–16, 1938.

Texas Public Health Association. San Antonio, Tex. November 7–9.

Third International Congress for Microbiology. Waldorf-Astoria Hotel, New York, N. Y. September 2–9, 1939.

Western Branch, American Public Health Association. Hotel Multnomah, Portland, Ore. June 6–8.

FOREIGN

International Union of Local Authorities. Bucharest, Roumania. June 13.

Ontario Health Officers' Association. Chateau Laurier, Ottawa, Ont., Canada. June 17–19.

Canadian Public Health Association.

Lord Nelson Hotel, Halifax, N. S., Canada. June 20–22.

International Engineering Congress. Glasgow, Scotland. June 21–24.

Royal Sanitary Institute. Portsmouth, England. July 11–16.

Scientific Congress of Doctors and Dentists—"ARPA." Prague, Czechoslovakia. July 21–25.

International Medical Society for Psychotherapy—10th Annual Congress. Balliol College, Oxford, England. July 29–August 2.

British Dental Association. Belfast, Ireland. July 29–August 3.

International Meeting for Cell Research. Anatomical Institute, Zurich, Switzerland. August 7–13.

International Congress on Housing and Town Planning. Mexico City, Mexico. August 13–20.

Sixteenth International Physiological Congress. Zurich, Switzerland. August 14–18.

British Association for the Advancement of Science. Cambridge, England. August 17–24.

International Veterinary Congress, Thirteenth. Zurich and Interlaken, Switzerland. August 20–27.

International Congress for the History of Medicine, Ninth. Zagreb, Yugoslavia. September 3–11.

Pan American Sanitary Conference, Tenth. (Last Conference was held in Buenos Aires, 1934.) Bogota, Colombia. September 4–18.

Special International Conference on Sewage Works and Disposal. Glasgow, Scotland. September 12–18.

Third United International Congress of Tropical Medicine and Malaria. Amsterdam, The Netherlands. September 24–October 1.

Eighth International Congress of Industrial Accidents and Occupational Diseases. Frankfort-am-Main, Germany, September 26–30.

Pan-American Congress of Municipalities. Havana, Cuba. November.

Best Sellers in the Book Service *for* May

Rural Health Practice—Harry S. Mustard, M.D.	$4.00
The Treatment of Clinical and Laboratory Data—Donald Mainland	4.50
Principles of Medical Statistics—A. Bradford Hill	2.25
Graphs: How to Make and How to Use Them—Herbert Arkin and Raymond R. Colton	3.00
Apes, Men and Morons—Ernest A. Hooton	3.00
Preventive Medicine and Hygiene (6th ed.)—Milton J. Rosenau, M.D.	10.00
The Foundations of Nutrition (3d ed.)—Mary Swartz Rose	3.50

Order from the Book Service

The American Public Health Association

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